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### THE URINE IN YELLOW FEVER: A CLINICAL STUDY.

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It is the opinion of many besides Dr. A. Flint that "further study of the urine in yellow fever by means of chemical and microscopical examination is a desideratum." Ballot, Blair, and Lawson, have asserted that the least doubtful sign of it is derived from an examination of the urine. These considerations moved me to direct particular attention to this excretion by the usual methods of clinical analysis, when the opportunity was afforded in the outbreak at Louisville, Kentucky, during September and October, 1878. Drawings of the sediments and brief records were made in the study of twenty-five cases occurring in the infected district and presenting symptoms more or less suspicious. Nearly all of these would have been grouped in the family of fevers called yellow had they appeared in a region where the disease was expected or where it had ever held undisputed sway. Inasmuch as this was the first time indigenous yellow fever had appeared in

Louisville, and its identity was considered by some not indubitable, the specific name is applied to fourteen out of the twenty-five, these being of the malignant grade and such as are everywhere recognised as the disease in question when it appears in the epidemic form. The epidemic slowly widened its boundaries, and ceased only with the appearance of a hard frost.

These cases were all in near local relation with the depot of the Louisville and Northern and Great Southern Railways, and constituted about half of the entire number that made up the outbreak. They presented these symptoms in common: ushered in by a chill; there were headache, backache, and soreness of the limbs, followed by a fever ranging in temperature from 102° F. to 105° F.; the epigastrium was tender or painful, and stomach irritable; colour of the skin at some time bright yellow; excessive vomiting, sooner or later black vomit appearing. The urine was scanty or suppressed and albuminous.

In most of them the eyes were congested and ferreted; the odour of the person slightly nauseous and ammoniacal. There were no regular remissions of the fever, which was in some cases variable until death, in others there was an apyrexia on the fourth day; and in all, though the temperature was elevated, after the reactive stage the pulse was peculiarly slow and compressible.

The early cases having been cinchonised without benefit, the later ones were not so treated. All but two of these severe cases were fatal between the fourth and the seventh day.

Some of them I saw in consultation with Dr. Cox, for the reports of others I am indebted to Drs. D. W. Vandell, Cox, Scott, Manly, and Palmer. The accompanying plate gives a faithful reproduction of the characteristic objects as seen with a power of 200 diameters.

Fig. 1 represents the deposit from the urine of a white boy, S—, aged fourteen. It was passed through the catheter, after deep pressure above the pubis, on the fourth day; death occurred in delirium on the fifth. It contained diffused granular matter and renal tube casts, highly, moderately, and slightly granular. Some have epithelium embedded, and in various parts of the field are single fat cells from the urinary passages, which are

studded with small flat globules. He had complained of malaise and frequent urination for several weeks. This may account for the fatty degeneration which was presented in one other subject who had been "on a beer spree" for a week before the initial symptoms. The urine was acid, lemon yellow, bile pigment, and one-half albuminous.

Fig. 2.—This is the appearance of a copious brownish deposit from S. J——, white, male, aged thirty-five, passed freely on the fourth day of fever. Death, preceded by hæmorrhages from various parts, ensued three days later at the Yellow Fever Hospital, to which in the meantime he had been conveyed. It was pronounced by the physician in charge as marked a case in every detail as any that had been received as refugees from Memphis, Tennessee. The objects seen are: at the top a highly granular tube cast, made probably of degenerated renal epithelium; such cylinders abound, though all have not a sharp fracture and squared ends. At the bottom is a cast of a convoluted tube, in one part large enough to show that it was probably made of the disorganised cellular lining, and diminishing in size to the calibre of the tube when intact. These interesting forms were quite common in the grave cases. The clear portion is probably the mucoid matter of Beale. In the middle of the field is a patch of tessellated epithelium from the bladder, and some scattered cells with strongly-marked nuclei. There is a group of spindle-shaped cells, probably from the pelvis of the kidney. On the right is the "compound granule corpuscle," found in the other cases also wherever the granular cast was to be seen.

This figure is a type of the deposit seen on and after the fourth day in the following cases: M——, aged forty-eight, white male; V——, aged two-and-a-half, white male; G——, aged thirty, white male; G——, aged twenty-six, white female; mulatto boy, aged twelve; McN——, aged thirty, white male; C——, aged forty-five, white male; C——, aged eighteen, white male; I——, aged twenty-five, white female; M——, aged thirty-two, white male—all of whom died. Only one case presenting these with the other grave signs survived. This was a negro boy, P——, aged eighteen, whose urine was of dark red colour from hæmatine, almost solid when the albumen was

coagulated, and in which was found bile pigment. This, the only case of hæmatinuria, recovered, and is to-day in fine health, which goes a little way to confirm the observation of Dr. Blain, that bloody urine was a favourable indication.

Fig. 3.—The deposit from a specimen voided without difficulty on the eleventh day after the primary chill, by F—, aged forty-five, white male, of robust frame, who slowly regained and now retains his wonted health. He resides at Tenth and Dumesnil Streets, a neighbourhood that furnished no other case to this report, at least half a mile from the infected district. His occupation as watchman in the freight depôt of the Louisville and Northern and Great Southern Railways brought him in the early morning within the range of a locality that proved so fatal to many. I saw him on the twelfth day in consultation with Dr. John E. Crowe; he then exhibited some restlessness, slight suffusion, and yellowness of the eyes; temperature normal, but pulse sixty-six and rather feeble; appetite and digestion good.

He had been seized with violent headache and pains in his limbs; then there was a chill and febrile movement that lasted about two days. His temperature was normal after the reaction, but his pulse compressible and sometimes only sixty to the minute. In the beginning his eyes were so red that his wife concluded he had caught cold in them.

Early in the attack his epigastrium became tender and his stomach very irritable; for several days he continued vomiting bile, but no blood. Towards the close of the first week, hæmorrhage from the gums set in, and, despite treatment, lasted nearly one week. He was cinchonised early. His urine was not examined until the eleventh day, when it was found acid, deep-red yellow, specific gravity 1.024, quantity normal, and one-fourth albuminous. Bile pigment was present, and a heavy lateritious deposit fell. Under the microscope amorphous urates were so abundant as to obscure other objects; gentle heat cleared them away, and there was revealed the field seen in Fig. 3: tube casts, granular, epithelial, and hyaline, with renal and vesical epithelium stained yellow. The worm-like mucoid casts were of a faint yellow tinge, or they would have been difficult to detect. I am inclined to call this yellow fever of a

variety different only in degree from the unquestionable type before adopted as a safe basis of classification. It is a significant fact that M——, above named as dying from the typical form, was a night clerk in the same dépôt with the last described person. Both resided in parts widely separated from the dépôt, and had nothing in common but employment there during the night or early morning.

Fig. 4.—Objects seen in a dense deposit from the urine of Mrs. V——, aged thirty, pregnant at the fifth month. It was voided on the fourth day after seizure; she died three days later. The urine was acid, scanty, bright-yellow, and one-third albuminous. Besides epithelium from the vagina, urinary passages, and kidney, there can be seen small waxy casts with a sharp fracture, some imbedded in granular matter, and one containing granular matter in its axis.

This was the only case which showed the waxy cast unmistakably. All the objects were stained yellow.

Fig. 5 is the appearance of the field on the third day in several cases examined at that time before the appearance of albuminuria. The objects are squamous, round and transitional epithelium from the bladder, and spindle-shaped cells probably from pelvis of kidney. Sometimes they were found in patches that covered half the entire field. They were found sparingly in some cases of a mild form in which albuminuria was at no time present.

Fig. 6.—Deposited from the urine of McK——, aged forty-five, who lived in the centre of the infected district, and whose history, as obtained from Dr. Crowe, is as follows: He was attacked October 10th with chill and headache, the temperature rose to  $104^{\circ}$ , and soon fell to  $99^{\circ}$ , F. The general run of his pulse was sixty to the minute; his stomach was irritable, vomiting bile. His skin was yellow and flushed. He was cinchonised, and became convalescent by October 22. He was well before the seizure, and it left no sequel.

The urine of the fourth day was alkaline, yellow from bile pigment, not albuminous, and gave a light deposit, with the following microscopic characters as seen in the figure: bladder epithelium singly and in patches; groups of leucine spheres of a yellow colour, and well-defined outline with concentric

markings, shown on the left and in the centre ; tyrosine needles in stars and sheafs, with abundant octohedra of calcium oxalate. The specimen from which the drawing was made was mounted with a ring of cement after keeping it a few days under cover without change, and is now in my cabinet as perfect as it was six months ago. The cells and other organic matters owe their preservation to the biliary principles. Granting that the epidemic was one of yellow fever, as shown by the previously-cited cases, the collateral evidence makes the conclusion inevitable that this last one occurring at the same time and in their midst is the ephemeral or mild form of the same disease. Leucine was recognised in imperfect forms where the urine had dried on the glass, in some other cases when biliary matter was abundant. Here it and its congener tyrosine are present beyond question.

## ON THE TREATMENT OF INCONTINENCE OF URINE.

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INCONTINENCE of urine neither threatens nor shortens life, it leads to no special degeneration of tissue, and, beside many of the other ills to which flesh is heir, its importance is almost dwarfed into a minor misery. But it may well be a question whether, in proportion to its pathological significance, any other infirmity is productive of so much inconvenience and mental depression or interferes so gravely with the present comfort and future prospects of its victims. To poor children, the habit of wetting the bed must always be peculiarly distressing, for not only are frequent changes of linen impossible in their station of life, but the not unnatural irritation of their relatives at what they believe to be merely a careless trick, leads not only to a lack of sympathy, but even to positive ill-treatment; and boys in a higher social position being thus rendered quite ineligible for admission to public schools, medical men are naturally very often appealed to for the relief of a disability which parents hopefully regard as readily curable. Whether this confidence is shared by ourselves, and in how far drug treatment has any real influence over this class of cases, will form the problems to be solved in this paper,—as briefly as may be, and almost exclusively from the teachings of my own experience.

Firstly, the surgeons must permit me to glance in passing into their territory, and to remind you how inability to retain its proper quantity of water may be impressed on the bladder by

the mechanical pressure of a stone, or by inflammation, or other irritation of the mucous membrane, causing too frequent or hasty contraction; or how a long prepuce or contracted meatus may contribute to the same result. We are bound to know and suspect, if not always absolutely to diagnose, these conditions; and the same remark may apply, though in a lesser degree, to causes to be searched for in those mysterious realms of uterine pathology into which I dare not penetrate. But concerning another source of reflex irritation we require to be more fully informed, and we must be prepared for the frequent inquiry as to how far ascarides may be held responsible for incontinence of urine. On strict physiological principles, we must unhesitatingly return a verdict of guilty; for Mr. Power, in his admirable *résumé* of this subject, tells us how Goltz,<sup>1</sup> whilst cleansing dogs with divided spinal cords found that whenever the wet sponge touched the anal region, free micturition occurred. It would, therefore, be quite reasonable to believe that the irritation produced by the movement of thread-worms in the neighbourhood of the sacral nerves might cause discharge of urine during the night, when the higher mental influences are suspended, but I cannot say that I have seen much evidence of this, nor have I been able to satisfy myself by the results of free purgation that these parasites muster in special force in such cases. I would therefore put this aside as an overrated cause, and proceed to divide my subject for convenient consideration into three classes.

The first of these includes those patients in whom debility plays a prominent part; they are pale and pasty and low in tone, depressed and languid, and feeling keenly their infirmity, when questioned on the subject, they reply in a downcast, shameful way; they conceal their troubles as long as possible from those around them, and their parents evidently consider their condition as reflecting in some degree on their family history or up-bringing, for we often find that medical aid is postponed as long as possible. Here we have no doubt an actual weakening of the sphincter vesicæ or an enfeebled state of the nervous centres in the lumbar portion of the cord, and tonic remedies, with good food and all hygienic means, are

prominently indicated. Small doses of iron have seemed to me to act better than anything else, and will perfectly cure the slighter cases, but we must be prepared for disappointment, and for the recurrence of the troubles after we had flattered ourselves on the perfect recovery of our patient.

No. 2 comprises cases of much greater obstinacy, usually congenital, occasionally hereditary, and depending no doubt on some condition of nervous weakness, or an irritability of the bladder, with excess of its propulsive powers. We must here, I think, make a distinction between the enuresis by day and that by night. The former is by far the more readily removed, but the latter is unfortunately almost incurable, by drugs at least, and generally takes its departure, if it does so at all, in obedience to the vigorous nervous shock sustained during the development of the genito-urinary organs which takes place at puberty. The drugs which have received most commendation are those which have a tonic influence on unstriated muscular tissue, and which may therefore be supposed to brace up into healthier construction those fibres which surround the prostate and membranous urethra and constitute the true sphincter vesicæ. Ergot has received high praise, but in several careful trials which I have made I have been unable to satisfy myself of any beneficial influence exerted by it over the troublesome condition for the relief of which it has been prescribed. Belladonna, on the other hand, has rendered me good service, and although only palliative, relieving, though not wholly curing the day incontinence, it, I think, is always well worthy of a trial. It must, however, be vigorously pushed up to the full development of physiological effects, which, when this drug is given to young persons, need never excite any apprehension; and I have been obliged to give ʒij doses to a boy of nine and ʒiiss to a girl of thirteen before good results were obtained. But unfortunately, as already mentioned, the incontinence is only improved during the administration of the medicine, and when it is withdrawn all the symptoms return in their depressing intensity. Santonine, so highly praised by Ringer, I have tried without effect. There is no doubt, as I have verified by personal experiment, that it causes an excessive intolerance of the bladder to the presence of urine almost amounting to incontinence, but

five-grain doses only made little children sick, without preventing them from wetting their beds ; and I did not venture to prescribe larger doses of a remedy which under certain circumstances may be both uncertain and dangerous.

Class No. 3 presents some points of interest, for here we find the evidence which more especially points out this malady as a neurosis, as a kind of chorea, if I may venture to call it, of perhaps the lumbar spinal cord, where the centres presiding over micturition dwell. In Mr. Power's most instructive paper he explains with all his usual clearness how the excito-motor centre exists at about the level of the fifth lumbar vertebra, and the inhibitory, if we grant the existence of such a centre, in the immediate vicinity, and as these centres are stationed there and not in the brain, we may suppose some local weakness, or irritability, or over-action, or under-action, to exist, at which we are as yet in a position only to guess. Several cases have come under my observation of other nervine lesions coinciding or even alternating with enuresis. In two, eczema was observed as a concurrent affection, in one congenital, as was the incontinence whilst in the other both began together, about the sixth year, and in both the reverse rule was observed to that which holds good in the asthmatical affections of skin disease, for here aggravation of the cutaneous malady always made the enuresis worse. But a third case seems still more conclusive, for in it a little boy of nine, who had been under my care with congenital enuresis, relieved but not cured by belladonna, came into the Belgrave Hospital for Children the following year with severe right-sided chorea, lasting for nearly four months, and during the progress of which control over the bladder was perfectly regained. Here it was evident that the nerve-force required to explode in the direction of incontinence, on being drawn into another and probably higher sphere of ganglionic influence, permitted the minor malady to cure itself for the time being. It might be reasonable to suppose that following out the pathological view which I have just indicated, nervine tonics might be expected to do good here, and in one case sulphate of zinc seemed to have some palliative effect. But strychnia, arsenic, and the usually recommended members of this therapeutic group, have seemed to me to do little more than

exert some tonic effect. I regret to say, then, in summing up, that I have lost much of that faith in drugs in the treatment of this disorder which I had nourished so carefully in books, and can only explain the numerous cases met with in medical literature by the undoubted fact that these cases are often more or less intermittent in nature, and that our hopes are often excited by hearing that our patient has not wet his bed for a day or even weeks, and again, but little pains are often taken to ascertain the permanency of these so-called cures. Any strong impression made on the nervous circle surrounding the act of micturition may put a stop to its abnormal activity for the time, but the broken habit may mend again, and I am sure it often does, and the sufferer is as badly off as before.

Another mode of treatment deserves a moment's consideration, and that is the plan of withholding all meat in the dietary. This has been very confidently vaunted as in all respects a specific, and of course can only act, as Parkes has pointed out a non-nitrogenous diet to do, by lessening the acidity of the urine; but in my experience I have not been able to trace any special acidity of the urine, or other deviation from its normal condition, to coincide with the incontinence; and further than this, one of the most obstinate cases I have ever seen took place in a little boy, who could never be induced by his parents to eat any meat.

Seeing that we can localize the motor centres so accurately in the lumbar cord, would it not be reasonable to attack the *fons et origo malorum* there by counter-irritation, on the same principle as we so often cure intercostal neuralgia, by blistering the spine, or by applying more gentle irritants over more prolonged periods? or warmth to that region might act in the opposite way to Goltz's cold sponge, and it seems to me that this plan may open up some more hopeful prospects in the future. Blisters have no doubt been used before, but it is only the actual result of Continental experiment, so accurately recorded by Mr. Power, which will enable us to apply this mode of treatment with some approach to scientific exactness. And for the same reason there would seem to be good grounds for the belief that in the carefully adopted use of galvanism we may

yet find a satisfactory adjunct to our scanty therapeutic resources for the relief of this troublesome condition.

Drugs therefore being so unsatisfactory we naturally summon the surgeons to our aid, and there is no doubt that an elongated prepuce occasionally coincides with, perhaps even causes, enuresis, and that its removal may effect a cure. But on the other hand it sometimes fails, or is only partially successful; for I recently had a case in which the operation was temporarily quite curative, the night incontinence, however, returning after a time, and defying all treatment, as too often happens.

Mr. Teevan (*Practitioner*, vol. xvii. p. 214), has recently proposed a new operation, which answered well in his hands, and which consists in enlarging the orifice of the urethra, which under these conditions is frequently contracted. A little boy of nine came under my care at the Belgrave Hospital last September for enuresis of several years' standing, occurring every night, and quite uninfluenced by a long course of very varied medicinal treatment. As a last resource I consulted my colleague, Mr. Stirling, and after a careful examination, the only surgical defect was found by him to be a decidedly strictured condition of the urinary meatus, which would hardly admit a fine probe. Mr. Teevan's operation was performed with decidedly satisfactory results, for although not absolutely cured, the lad could retain his urine for several nights in succession, and on several occasions went for a couple of weeks without wetting his bed. But the same uncertainty which seems to attend all modes of treatment for incontinence was also noticed here, this period of exemption being followed by a relapse, during which he was as bad as ever, and this in its turn was succeeded by a second stage of amendment, in which the nightly accident happens perhaps only once or twice a week. I should therefore be inclined to look upon Mr. Teevan's plan as suggestive and valuable, probably always palliative, and occasionally even curative, as in his own recorded case.

To sum up then, I have found that whilst a certain proportion of the milder type of cases is curable by iron, too many will not only resist this medication, but will barely undergo temporary alleviation by the most careful and varied drug treatment. But

the moral which I would wish to draw is, not that we must necessarily run into the full extreme of an active scepticism, but that we must repeat and multiply our experiments, noting carefully the effects of different remedial agents in different cases, trying to find out which may really be useful, and when and where. Electricity and counter-irritation may be of service, and we must always utilize the benefits of moral influence and careful dietary, and all available hygienic measures, to the fullest degree.

(This paper was read before the Harveian Society of London.)

## THE STORY OF A WHITLOW WITH TRACING.

BY C. HANDFIELD JONES, M.B., F.R.S.,

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ON January 26th, 1878, A. B., aged 59, got without any known cause on 25th, at night, pain in the last segment of the right index-finger. The next day, after being some time in hospital atmosphere, the pain became severe. A poultice was applied. He returned home feeling ill and shivery, could not get warm all the evening; went to bed and slept after some two hours. Lay in bed till the evening of next day, when the finger, though swollen and very tender to pressure, was not nearly so painful.

29th.—Finger continued in a state of moderate inflammation; a droplet of pus escaped to-day. Right hand much warmer than left, and its veins much fuller.

30th.—Finger hot, swollen, and tender, a trifle of serum exuding from puncture of yesterday. Veins of right dorsum much fuller than those of left, which are hardly visible. A pale pressure spot disappears instantly. The collateral arteries of the adjacent sides of the right index and mid-finger pulsate notably, so as to be distinctly felt at the second cleft and near it, those of the left fingers do not; cannot be felt. Temperature of inflamed index near its tip, the pulp being laid on a thermometer bulb resting on a flat surface, is  $91^{\circ}5$ ; that of left is  $63^{\circ}$ ; taken immediately after with same instrument in same position. Temperature of right mid-finger pulp  $91^{\circ}5$ , of left  $65^{\circ}$ , temperature of air  $56^{\circ}5$ .

February 2nd.—Yesterday, the state of things was just the same, though the inflamed segment of the finger had been

strapped up for two days. He felt sure that pus had formed, and in the evening had the finger freely incised. No pus escaped, but there was free bleeding. The finger was easy all the night; the temperature taken in the mouth some hours after the incision was  $98^{\circ}2$ . The following morning, the temperature of the air being  $56^{\circ}5$ , that of the right mid-finger was  $92^{\circ}5$ , that of the left  $67^{\circ}5$ . The veins of the dorsum of the hand were rather less full.

On the night of the 4th, A. B. suffered great pain, and got but little sleep. In the morning four or five drops of pus were let out; the finger was kept in water dressing all day, and the following night was good.

On the 6th, the finger was very red but less tender, no pale spot could be produced by pressure. The temperature of the right index was  $91^{\circ}$ , of the left  $65^{\circ}5$ ; that of the right middle finger was  $69^{\circ}$ , of left  $64^{\circ}$ . Temperature of air of the room was  $57^{\circ}$ ; urine on the fourth contained plenty of uric acid.

March 11th.—Dead epidermis falling off in thick flakes from the pulp of index, the surface below is hyperæmic and at one spot tender. The hand is still hot, and veins of dorsum are full.

15th.—The finger is improving, can be used better. The spot from which a little pus escaped is almost the only tender part. Some benefit has been produced by the pressure of an elastic ring, which, however, if worn more than a few minutes, causes much pain, though at first it feels comfortable.

16th.—Right index is still  $92^{\circ}5$ , left  $89^{\circ}5$ .

March 5th.—Finger nearly natural, only the small spot mentioned above is somewhat uneasy, and the epidermis does not form normally over it. Hyperæmia has ceased. It should be mentioned that two other members of the same household had ordinary suppurating whitlows about the same time.

This fact, coupled with the absence of any morbid diathesis in A. B., points strongly to the conclusion that the *cause* of the whitlow was something from without, some external injurious influence, and not any poison bred in the system. The action of this cause produced general and local effects; the former, consisting in shivering, malaise, and depression, were of short duration; the latter continued some three or four weeks, declining gradually.

The small area occupied by the latter is remarkable, and so is the exceeding scantiness of the suppuration, especially when the severity of the pain and the amount of hyperæmia is taken into account. Both facts seem to testify to the reluctance—*sic venia verbo*—of the *tissues* to be involved in the morbid process, and to the tenacity with which they persisted in their normal mode of nutrition in spite of circumstances tending strongly to derange it. That vast differences in this respect do exist seems to me quite undeniable. A Swiss guide, mentioned by Mr. Wills, whilst on the summit of Mont Blanc had his hands so severely frost-bitten that they were quite black, at first utterly insensible, and after hard rubbing extremely painful for some hours. Yet he recovered with but slight damage,—the loss of some of his nails, if I remember aright. Compare with this mountaineer a man whose vitality had been greatly impaired by any serious disease, and whose integument readily sloughs from a little undue pressure. Is not the conclusion inevitable that the skin in the one resists morbid agencies much more effectively than the other?

The pain in the last segment of the index-finger, which was severe, was not, I believe, essentially dependent on the hyperæmia of the part, as it was not felt in the mid-finger, whose temperature,—no doubt, dependent on the hyperæmia, as it far exceeded that of the corresponding right digit—was equal to that of the inflamed area. It is true that the pain was relieved by pressure for a minute or two, but it soon increased again so much that the compression had to be removed. Cold applied to the part by the ether spray just before the incision was made also increased the pain. The view seems to me most probable that the pain, or at any rate the morbid impression made on the sensory nerves of the part, determined the hyperæmia. The radial artery of the left side, as shown by the tracing, was certainly dilated owing to paralysis of its muscular coat, and its digital branches were no-doubt in the same condition. This paralysis *may* have been primary, the direct result of the morbid cause; or it *may* have been secondary, *i.e.* reflex, dependent on the local pain and sensory derangement. Had it been primary the hyperæmia would probably have been confined to the index-finger; as it was much more extensive than the focus

of disease, the alternative seems to me far the more probable. If we substitute for the undemonstrated cause and the finger in the above history, a grain of sand lodged in the eye provoking conjunctivitis, we have a precisely similar instance.<sup>1</sup> The same holds good of many like imitations produced by gross chemical agents, such as arsenic and mercury. But inflammatory hyperæmia is not always produced in this way. In very many maladies, as in diphtheria, erysipelas, influenza and common catarrh, the hyperæmia of the inflamed area results from a primary paralysis of the arteries and capillaries of the affected region. No one can regard the eruption in a case of scarlet fever or roseola as dependent on a reflex paralysis of cutaneous



Tracings taken during existence of a whitlow on right index finger. *a a*, left radial; *b b*, right radial.

vessels, for there is no irritation of afferent nerves to produce it. In fact it seems to me necessary, as it did more than twenty years ago, to recognise an essential difference between *neuro-vascular inflammation* on the one hand, and *tissue inflammation* on the other. Not of course that the two are not often more or less blended, but neither are typical instances of either kind rare, and the determination of the degree in which one or other predominates is vital to correct treatment.

The last point to notice is the failure of the incision to procure any arrest of the morbid process, or lessening of the hyperæmia. These did not permanently decline until after a few drops of pus had escaped. This event, common in like cases, indicates either the expulsion of some *materies morbi*, or more probably the cessation of the dynamic disturbance in the part, which has spent itself in the formation of corpuscles heterogeneous to the healthy system and to the effete.

<sup>1</sup> Vide Lauder Brunton in *Brit. Med. Journ.*, 1874, i. p. 40.

## ON VESICULAR EMPHYSEMA AND COLLAPSE OF THE LUNG AS COMPLICATIONS OF BRONCHITIS.

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*(Concluded from p. 432.)*

WE may safely say that if a person has suffered from chronic bronchitis, there will, as a rule, be more or less vesicular emphysema. The chest in such a case is barrel-shaped, the lungs are found to cover the heart, they have a greyish-pink colour, and the pigment which exists in all adult lungs is seen specially well between the lobules, on account of their distension and pale grey colour. The over-distended part does not crepitate so much as the natural lung, and, when cut into, is found to be anæmic, while the centre of the lung is usually deeply congested. There is not necessarily, in such a chronic case, any collapse of neighbouring portions of lung tissue. The whole organ is usually increased in volume, but the emphysema is best marked at the apices and anterior margins.

Vesicular emphysema, however, also occurs as a complication of acute bronchitis, more frequently apparently in children than in adults, and, as Dr. Gardner pointed out (*Edin. Monthly Journ.* 1851), collapse of neighbouring portions of lung tissue usually accompanies this form.

The etiology of emphysema has been matter of dispute for many years, and even yet authorities are by no means agreed as to its dynamics. Mendelssohn and Jenner seem to have been

the first to suggest the "forced expiration" theory of its production, although the possibility of an expiratory effort, as in coughing, giving rise to over-distension of the air vesicles is by no means universally admitted. The cough of a chronic bronchitic is one of the most constant features of the disease, and *a priori* seems to be a very rational explanation of the accompanying emphysema. In coughing, a full inspiration is taken, the glottis is closed, and then the expiratory muscles, contracting upon the lung, compress the air within it and raise its tension. Dr. Gairdner, however (*loc. cit.*), compares the chest in inspiration to a bladder filled with air, and, very properly, in view of this comparison, says that if it be equally compressed on all sides no distension can occur, but, on the contrary, it will become diminished in size. This would be true were the likeness between the chest filled with air and a bladder, under the same circumstances, literally correct. When, however, we come to compare the two it is evident that the conditions are not really collateral. In the case of a hollow viscus like the bladder distended with air, and with no aperture of exit, the contents are constant, but in the case of the chest the lungs are not the only occupants, but the heart and large blood-vessels take up a very considerable space. The size of these varies, according to the amount of blood contained in them, so that a considerable space might be left in the chest which will naturally be filled by the over-expanded lung. In the circumstances that we have presupposed, in forcible expiration, the lung is distended to begin with, that is to say, it contains as much air as the full inspiratory capacity of the chest will admit. It is then forcibly compressed, and the tension of the contained air is raised, and if that were all that really happened we cannot see how the lung could possibly become over-distended, and in this respect we would coincide in Dr. Gairdner's view. But is this really all that occurs? We think there is another effect of the forcible expiratory movement which is overlooked in this comparison, namely, that the blood which is contained in the heart and large blood-vessels is at the same time driven outwards, as evinced in the distension of the temporal arteries and the venous turgescence which chronic bronchitics exhibit when coughing. This would leave a certain amount of

space, were it not that the increased tension of the air within the lung drives the latter into the part where the void is left. The parts at which we would expect the emphysema to be most marked would consequently be near the heart and large blood-vessels, and as a matter of experience this is generally the case, the anterior margin being notoriously the situation in which vesicular emphysema is most often met with. The cause of its localization to this part is generally said to be that the lung is weaker here than elsewhere, and that consequently it tends to expand more easily. We cannot see that this should be so, for the lobular septa, which practically are the means by which the air-vesicles are retained in their relative situations, are better developed at the anterior margins than elsewhere. The compressed air acts equally in all directions, and there is no reason, so far as we can see, why the anterior margins and apices should become over-distended more than any other part of the periphery, on the supposition that the cause is an expiratory effort. It seems to us much more probable that the tension of the air within the lung is first raised, then a considerable quantity of blood leaves the chest, and that part of the lung from which the support has been removed becomes over-distended. There has been taken off from this side of the lung a certain amount of the surrounding support afforded by the contents of the heart and vessels, and the air within the compressed lung being at a high pressure drives this portion outwards.

There is little doubt, however, that although, in chronic bronchitis, the alteration in the contents of the chest in forced expiration must play a most important part in originating the emphysema, yet the enlargement of the whole chest, and more especially of the intercostal spaces seen in those suffering from it, must materially aid in the process. The latter, apparently from the inability of the intercostal muscles to withstand the pressure from within, may be seen to become dilated in an emphysematous person with thin chest-walls in each forced expiratory effort.

Collapse of the lung is also a common accompaniment of bronchitis, more especially of an *acute* attack, where the small bronchi are filled with mucous secretion, and where there is, at the same time, a certain amount of acute catarrhal pneumonia.

The appearance of the lung in such a case is very characteristic. There are patches over its surface which are sunken below the level of the surrounding parts, and which have a bluish-purple colour. The parts around them are of a light pink hue, and are seen to be over-vesicular. The lung on being cut into is found to be much congested, and, when exposed to the atmosphere for a few minutes, becomes of a bright scarlet colour, contrasting in a marked degree with the dark red colour which the blood presents in *chronic* bronchitis with emphysema. The mucous membrane of the middle-sized bronchi is red, and contains a little muco-purulent secretion, but large numbers of the smaller sized bronchi are completely occluded, from the muco-purulent discharge which they contain. It can be squeezed out from them, and is tough and tenacious, although as yet fluid. Catarrhal pneumonic patches of a greyish colour, and with an indistinct margin, are seen over the lung, and yield some of the same muco-purulent secretion on being squeezed. These, however, are not hard, the hand on being passed over them detecting their boundaries with difficulty, evidently from the as yet fluid state of the pneumonic secretion. The collapsed portions of lung in connection with these are visible on section, placed at the periphery, and involving a small bronchus and attached lobule or lobules.

The cause of the collapse in such a case is that a terminal bronchus, opening into a group of air-vesicles, becomes plugged with a mass of muco-purulent discharge. This, we have found, may be formed locally, or, as sometimes happens, may be inspired from a bronchus of larger calibre, the occluded bronchus sometimes retaining a complete layer of columnar epithelium, and evidently not being that from which the secretion has been formed. The accompanying figure (Fig. 38) shows the occlusion which may occur. It was taken from a case of acute bronchitis, with complete collapse of the portion of lung beyond, and vesicular emphysema of the surrounding parts. It will be noticed that the plug of catarrhal secretion has apparently not been formed at this part, but must have been inspired, as the epithelium on the bronchus is still complete. The manner in which the collapse is brought about in such a case is evident. The mucus accumulates within the bronchus, it is

moved to and fro by the inspiratory and expiratory efforts, but gradually becomes drawn outwards in the inspiratory act towards the periphery, and is impacted in a small terminal bronchus. The plug will allow the air to escape from the occluded portion of lung, because the calibre of the proximal end of the bronchus is greater than the distal, but, when drawn backwards in inspiration, it becomes impacted in a small terminal twig, and effectually prevents the further ingress of air. It therefore follows

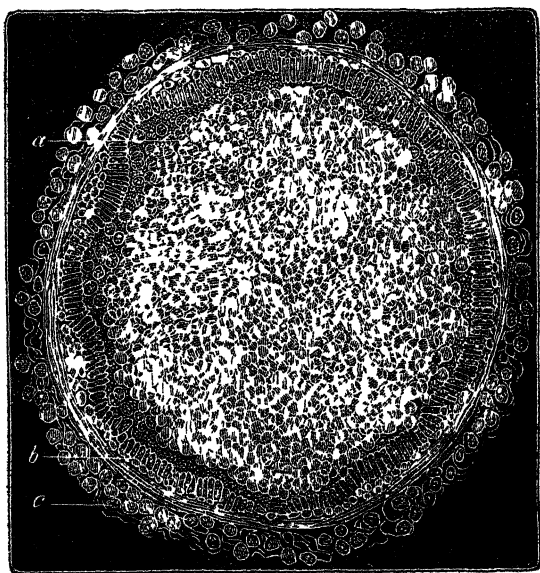


FIG. 38.—Small bronchus in acute bronchitis, occluded by a plug of catarrhal secretion,  $\times 350$  Diams. *a*, catarrhal plug, *b*, epithelium lining bronchus, *c*, surrounding adventitious coat infiltrated with cells

that the collapsed portions of lung will be at the periphery where the bronchi are smallest. The catarrhal plug acts like a ball-valve in allowing air to pass in one direction, but preventing it from passing in the other.

When the collapse is complete in several parts of the lung, then the remaining vesicular portions of lung-tissue are insufficient in bulk to fill the chest in full inspiration, and consequently become over-distended from atmospheric pressure.

is only under such conditions that the otherwise negative inspiratory force can have any action in dilating the air-vesicles. So long as the lung is sufficient in bulk to fill the cavity of the chest in full inspiration, then the inspiratory act can have no influence in causing over-distension. If the air within the lung becomes unduly stretched by the inspiratory act and its tension lessened, then the atmospheric influence comes into play, but under ordinary circumstances, the tension of the air within and without the chest being virtually equal, no disturbance of the atmospheric balance occurs.

#### ON BRONCHIECTASY AS A COMPLICATION OF BRONCHITIS.

We have already described the bronchiectatic cavities which are so commonly found in chronic interstitial pneumonia resulting from bronchitis, and have shown that the cause of the ectasy in that disease is to be sought in the traction of the thickened interlobular septa upon the bronchial wall. The bronchial wall becomes distorted, pulled out into angular cavities, and greatly thickened, on account of the cellular and fibrous formation in and around it. Bronchiectasy, however, frequently occurs in connection with bronchitis, quite independently of there being any interstitial pneumonia, and, in this case, the dilated bronchi have quite a different appearance.

It commonly happens that the subject of this latter form of bronchiectasy has been a chronic bronchitic, and there sometimes is very considerable emphysema concomitantly present. The bronchial dilatations are uniform in shape, and the walls, instead of being thick and fibrous, are thin and stretched. Their shape is either fusiform or saccular, more often the former. When saccular, the dilatation seems to occupy the end of a bronchus, while the lung beyond will usually be found to be non-vesicular, from collapse or from pneumonic infiltration of the air-vesicles. Collapse along with the sacculated form of bronchiectasy is as marked a complication as emphysema is in others. When accompanied by emphysema, the dilatation of the bronchi is usually fusiform or "finger-glove" in character, the bronchus being nearly as large at the periphery as at the centre of the organ, and there is no marked obstruction at any

part. We have had the opportunity of studying the saccular form in one very remarkable instance, among others, in the lung of a child who had suffered from bronchitis and acute catarrhal pneumonia. The lung on section presented all throughout its substance large round saccular bronchiectatic cavities from a quarter to half an inch in diameter, lined with a smooth membrane, and nearly empty. The air-vesicles were completely collapsed all round these, so that the lung looked more like that of a tortoise than that of a human subject. On careful microscopic examination no chronic interstitial pneumonia was found which might account for the formation of these cavities, and the uniformly round shape which they presented precluded the idea of their being thus formed. The bronchiectatic cavities, on microscopic examination, presented the usual appearances of bronchitis, but in the smaller bronchi and certain of the air-vesicles the catarrhal secretion had accumulated and produced occlusion of them much in the same way as seen in Fig. 38. We have frequently seen this sacculated form of bronchiectasy in other cases of bronchitis with collapse, but never to the same extent as in this. In the adult they usually contain intensely putrid catarrhal products, which seem to have accumulated within them after the dilatation took place. It is the rarest occurrence to find an abraded surface on one of these bronchiectatic cavities, and we must express our belief that many of those described as ulcerative bronchiectatic cavities have in reality arisen from necrosis of solidified lung tissue. The cause of their smooth appearance is apparent on microscopic section; it is due to the elastic basement membrane that we have so often referred to when treating of acute bronchitis. It is this which prevents the bronchiectatic cavity having a granulating surface, for by its elastic reaction it prevents the superficial vessels from being thrown out on the bronchiectatic wall, so as to constitute granulation loops. Were it not for this basement membrane the bronchus would be a specially favourable site for the production of a granulating surface, seeing that there is here an abundant superficial plexus of vessels, which, if not restrained, would, on the principles we have enunciated in our paper on the "Process of Healing,"<sup>1</sup> be thrown out on the surface as granulation vessels. We have never

<sup>1</sup> *Journal of Anatomy*, July, 1879.

seen a true granulating surface on a bronchus in bronchitis, although we have occasionally observed the basement membrane thrown out into villus-like processes, which may be regarded as the nearest approach to a granulating surface that is ever reached where the basement membrane is entire. The basement membrane has the same restraining influence here that the skin has on the subcutaneous vessels. Remove the skin and expose the surface and it will granulate, the reason being that the restraining action of the cuticle upon the underlying vessels has been taken away, and the blood-pressure within the latter throws them out on the surface. The same would apply with special force to the bronchi, for if the basement membrane were removed from their surface then there would be no medium of restraint to re-act upon the underlying vessels, and they would undoubtedly form granulations. The basement membrane is, however, always present, and this accounts for bronchiectatic cavities always presenting a smooth interior and never granulating.

The formation of these saccular and fusiform bronchiectatic cavities with thin walls, and unaccompanied by chronic interstitial pneumonia, is matter of interesting speculation. Professor Stewart<sup>1</sup> supposes that there is primarily an atrophy of the wall arising from some unknown cause, and that the bronchus being thus weakened is more readily acted upon by alterations of atmospheric pressure. The accumulations of catarrhal products which take place within them he regards as of secondary occurrence, and he would look upon their presence as merely due to the retentive character of the bronchiectatic cavity. That an atrophy of the wall, and more especially of the muscular coat, is a strong predisposing cause of bronchiectasy, is, we think, indisputable. We have already shown how this may arise from the presence of bronchitis. The cellular accumulation which is met with in the bronchial wall, as a result of bronchitis, comes to exert a deleterious pressure upon the muscular fibres, and gives rise to atrophy of them. It can further be easily understood that if the muscular coat is surrounded and penetrated by this cellular effusion its function in

<sup>1</sup> *Edinburgh Medical Journal*, 1867.

resisting bronchial dilatation from forced expiratory efforts will be seriously interrupted.

It cannot, therefore, we think, be denied that there would be the liability in coughing to dilatation occurring in the bronchi, just as it takes place in the surrounding air-vesicles. The dilatation of the bronchus in such a case is uniform, and is accompanied by similar dilatation in the air-vesicles, and it is only natural to conclude that the one is a mere extension of the other. The agency by which the dilatation is effected is undoubtedly the compression of the air contained within the lung in forced expiration.

In accounting for the sacculated dilatations at the end of a bronchus, where there is accompanying collapse of the air-vesicles, the same explanation will not hold good, for here we have not the universal dilatation of all the air-passages, but collapse of certain parts of them, namely of the air-vesicles. In such a case the terminal bronchi will be found to be plugged, and collapse, as a consequence, takes place in the parts of the lung into which the occluded bronchi open. The bronchial walls are, at the same time, weakened from cellular effusion into them, as bronchitis usually occurs along with the bronchiectasy. It consequently seems only reasonable to expect that when a full inspiration is taken, some of the bronchi must become dilated. The lung must expand in order to follow the enlargement in the different parts of the chest, the air-vesicles in the collapsed portions cannot expand, and the next less resistant of the respiratory passages, namely, the small bronchi, become dilated, on account of the inspiratory pressure.

It also seems likely that, in some instances, the mere accumulation of bronchial secretion within a bronchus may, when it expands from fatty degeneration, cause dilatation of a bronchus. This is always partial, and is usually accompanied by more or less pneumonia, and frequently by partial gangrene of the lung.

In summing up the different factors which may be instrumental in producing bronchial dilatation we find them to be the following:—

1. The traction of cicatricial tissue on the walls of the bronchi.
2. Forced expiratory efforts.

3. Inspiratory pressure, when there is extensive collapse elsewhere.

4. Accumulation of catarrhal products within a terminal bronchus.

#### ON CATARRHAL PNEUMONIA AS A COMPLICATION OF BRONCHITIS.

The frequency with which pneumonic infiltration of groups of air-vesicles follows an acute bronchitis supports the theory that a considerable amount of the pneumonic infiltration is simply bronchitic secretion which has been inspired. An identical appearance is noticed when an aneurism ruptures into the trachea and some of the blood passes into the lung. Groups of air-vesicles are seen filled with blood, and they have a shape and distribution similar to those seen in catarrhal pneumonia, the blood being substituted for catarrhal products. In this case the blood has evidently been sucked into the lung during an inspiratory effort, and there seems very good reason to believe that in acute bronchitis some of the pneumonic infiltration is inhaled in the same manner. Microscopic examination of the pneumonic infiltration favours this view, as the cellular products in many cases show that they have been derived from the bronchi.

## ON LOADED AND BLOCKED RECTUM, AND MANIPULATIONS PER RECTUM.

BY DR. G. DE GORREQUER GRIFFITH,

*Senior Physician to the Hospital for Women and Children; Consulting Physician,  
Accoucheur to St. Saviour's Maternity.*

SOME years ago I was called to attend a child who had been ill for several days, seemed to be in great pain, and was constantly forcing and bearing down. With difficulty I could make an examination per anum; but, on doing so with the forefinger, I found a stony-hard, dry mass blocking up (like a ball valve) the entire rectum. I could not break it up with the finger, and had to content myself with giving aperients with the object of inducing watery evacuations that would empty the upper bowel, and also fine down and soften the hard fæcal mass below. The medicines happily had the desired effects, and on my calling next day I was just in time to find my little patient in, as it were, the forcing throes of labour, from which she was soon delivered by the expulsion of a mass quite as large as a good sized William pear. After this evacuation the general symptoms of malaise speedily disappeared without any trouble.

In April, 1879, a lady about fifty-five years of age came to me with symptoms of blood-poisoning, and of being generally out of health. She was relieved of these symptoms; and shortly afterwards she sent to me saying she was so ill from piles, that she would be unable to call upon me. One of my assistants, Mr. Bamber, accordingly visited her; but, as she declined to allow an examination, he prescribed some aperient medicine to be taken, and a soothing ointment to be applied to the anus. Next morning she drove up to me, and on passing the forefinger

into the rectum, I found two hard faecal masses in the bowel, ovoid in shape, stone-like in hardness ; one being about the size of a large William pear, and the other of a smaller ; they were both movable, the mucous lining of the intestine being not dry, but well lubricated with an excess of the natural secretion, the calibre being large. Tender, and hyperæsthetic, as were the anus and all the adjoining parts, dense and unyielding as were the ball-valve-like obstructions, I knew it would be useless to attempt getting them away by either the fingers or the hand introduced in recto, or by scooping them out with spoon or otherwise. I therefore ordered her to take by the mouth a jalap and sulphate of soda aperient, accompanied with calomel, and by the rectum to have an injection of warm water administered, for the purpose of softening and melting down the scybalous masses, of irritating to action the lower bowel, and thus expediting their removal. Two days afterwards she came to me ; and it occurred to me, that instead of giving her chloroform, as I had intended, and introducing the fingers, or the entire hand, or some scooping instrument, I would see what could be done by passing the fingers of the right hand as high up as possible into the posterior *cul de sac* of the vagina and against its posterior wall, thence exercising backward and downward pressure upon the masses, while the fingers and thumb of the left hand, buried in the ischio-rectal spaces (devoid of fat in the present instance) compressed the bowel, and the therein contained fæces.

The aperients had operated well ; the masses were reduced in size, and somewhat softened, and the consentaneous double-handed expedient which I adopted for their removal was so effectual, that they were far more readily forced away than I had anticipated, and without the use of any anæsthetic. True, there was of necessity a good deal of dilatation of the lower part of the bowel, and the mucous lining of the anus was split in some places ; but there was very little suffering, no faintness, no exhaustion, and the patient was able to drive home very shortly afterwards.

While on the subject of emptying the rectum, I may be pardoned for quoting the words of my paper "On Post-Partum Hæmorrhage, and Modes of Controlling and Arresting it," published in the *Obstetrical Journal* (Feb. 1879 page 707)

"I believe we do not at all sufficiently utilise the rectum as a way of usefulness, and an open road of power; a way of which powerful advantage may be taken—a pathway always ready to our hands, for diagnosis and prognosis; of remedial measures, and often of curative: a pathway, I consider, too frequently forgotten, neglected, or considered not worth using, both by physicians in medical cases, by surgeons in surgical, and by gynaecologists and obstetricians in their particular branches. In this opinion I am well sustained by Mr. Spencer Wells, by Dr. Priestley, Dr. Broadbent, Mr. Maunder, Mr. Teevan, and by the late Professor Simon of Heidelberg."

In a paper which I read before the Harveian Society, and which was published in the *Edinburgh Medical Journal*—"On Fæcal Accumulations Simulating Utero-Ovarian Tumours," I state, "I am the more encouraged to bring these cases forward, because you, Sir—our President—and Dr. Broadbent, and Mr. Teevan agree in the value of free exploration of the bowel" (in the manner to which I refer). I have no hesitation in recommending the introduction of the hand and arm for this purpose, provided of course that there are not contra-indications, and that the operator's hand and arm are not large, are rather small than otherwise, are not in unsafe disproportion to the dimensions of the rectum.

I do not know in what year Professor Simon first advocated and adopted the exploration of the interior of the abdomen by means of the hand and arm passed into the rectum; but I am fully aware that he laid great stress on the advantage of such a procedure, as an aid to diagnosis. A most distinguished surgeon of our own city (London), Mr. Maunder, adverted to the plan many years ago, and actually put it into practice in 1868, as he personally informed me, and as we also learn by his remarks on "Diagnosis by the Hand in the Rectum." (See *Lancet*, 1868, p. 586, and vol. 1,469.)

As regards the exploration of the bowels by means of the hand and arm introduced per anum, it is hardly necessary to say that, according to the size of the operator's hand, and that of the patient's rectum, there is a correlative forcible distension, and corresponding rupturing in the mucous membrane of the anus; and, in some cases, of the sphincter ani also; indeed

sometimes this latter may have its fibres stretched and even torn to such an extent that incontinence of fæces results, but only for a short time, the mischief being quickly repaired—eight or ten days sufficing to remove the inconvenience by setting the parts right again. I have never known violent inflammation of the bowel result from this procedure, though inflamed piles have followed as a direct sequence.

Of course, if there were any suspicion of malignant disease affecting the bowel, the hand should not be forced through the anus: but that would have been previously ascertained, as would also the general conditions of the rectum, by an examination conducted with the forefinger. These are precautions which immediately suggest themselves, and hardly require to be mentioned; yet, as it is well to bear them in mind, I shall not withhold the warning. To arrest post-partum hæmorrhage, we may introduce the *left* hand into the rectum, passing it as high up as may be needful to command the entire uterus, and to employ an effective force, directed from above downwards, while the *right* hand, placed externally on the abdomen, compresses the womb from above downwards and backwards, the two hands, thus acting consentaneously on the organ, encompass and compress it between their simultaneous grasp, thereby arresting the blood flow, and at the same time stimulating the uterine muscular coat to natural contractions; thus in two ways preventing dilatation of the womb.

In parenthesis I would here say that by means of the hand in the rectum we have a ready method of completing enucleation and expulsion of intra-uterine growths, when their ablation by that method is considered preferable, and after their outer coats, or shell, so to speak, have been laid open by incision, or by some other method of effecting a breach of continuity in their surface.

As bearing on the subject of “the arrest of post-partum hæmorrhage by means of the hand in the rectum,” I will here append a recent letter from me to the *Medical Press and Circular*, in which I referred to the not unfriendly criticisms made, in that periodical, on my paper which appeared in the *Obstetrical Journal* for Feb. 1879. The words of the kindly reviewer are:—

“But it has been recently shown that introduction of the hand into the rectum is not only a difficult operation, but one that is attended with some danger. Besides, the safe introduction of the whole hand into the rectum should be effected in a gradual manner, and while the patient is under chloroform; whereas, its introduction for the purpose of compressing the aorta in cases of post-partum hæmorrhage would have to be immediate, and without the assistance of anæsthetics.”

It is quite true that the introduction of the hand into the rectum is a difficult operation, and attended with some danger, if the operator have a large hand, and be rough and hurried in his manipulations, thrusting and forcing the hand into the bowel, or attempting to do so, instead of gently, and with boring motion, working in the fingers folded together cone-shaped, and well larded, and then the hand, narrowed as much as the operator possibly can. If there were malignant disease of the bowel, or organic stricture, then, indeed, if the operation were attempted, it would be difficult and most dangerous. But in such instances no man should be rash enough to attempt such a proceeding, and would, of course, by digital examination, first ascertain the state of the bowel. I can understand that in some cases, other than childbed, it would be especially “difficult,” if called upon to perform it without being able to have had the bowels cleared out, though such must be extremely rare; and “dangerous” to some, because of pain and shock, if anæsthetics could not be administered. But in the post-partum patients, to whom I refer, it is not so difficult, because the bowels have been unloaded during the parturient efforts; their muscular coats are relaxed, as well as the sphincters, owing to the post-partum loss and hæmorrhage, which call for such interference; and the necessity for inducing anæsthesia obviated because of the unconscious or semi-unconscious state of those patients in whom the operation is needed; and the introduction of the hand will, indeed, oftentimes be a judicious stimulus towards rousing the sinking energies.

It must be borne in mind that it is a last resort, and it will prove a very effectual one, I have no doubt; that the patient is *in extremis*; and, that there is only the choice between her dying of hæmorrhage, and the performing of this operation,

which the reviewer speaks of as "difficult, and one attended with some danger."

The difficulties, I hold, are in a great measure removed by the carefulness and skill of the operator, provided he has not an unduly large hand; the danger also is reduced to a minimum, for the same reason, as well as because of the prostrate and lethal, or lethargic state of the patient. Moreover, I greatly question whether, in such a post-partum condition, there is more danger (or even as much) in introducing the hand into the rectum, than into the vagina and uterus; and whether there is more risk in this procedure, than in injecting iron into the womb—flabby, relaxed, and unable, through general and local debility, to contract in response even to such stimulation, and when the hand within its cavity has failed to excite to natural contractile efforts. By tourniqueting the aorta with the back of the hand which is in recto and is compressing the uterus—in the manner I have named—we have time to have stimulants given our patient by mouth and nose; we are enabled to have the womb also compressed by the hands of an assistant; to permit it to rest; to allow clotting of the blood in the open uterine vessels, the rush of blood being stopped, or very greatly eased, by the compressing; while, at the same time, we throw back upon the vital organs the blood, diminished in quantity, and keep up their supply, thus sustaining them, and preventing the stoppage of their functions and the cessation of life.

## DISEASE CAUSED BY CYSTICERCI IN BRAIN MIS- TAKEN DURING LIFE FOR HYDROPHOBIA.

BY T. M. DOLAN, F.R.C.S.E.

IN my report on "Rabies, or Hydrophobia,"<sup>1</sup> I pointed-out many possible sources of mistakes in diagnosis, and insisted on the necessity of an accurate one, in order that our list of deaths from hydrophobia might not be swelled by certifying a wrong cause of death. I endeavoured to illustrate this by facts. The following history confirms me in my opinions :—

1st. That we should be very careful before pronouncing our diagnosis—hydrophobia.

2nd. That there should be a post-mortem examination, made by experienced pathologists, in every reputed case of death from hydrophobia.

It also appears to me to confirm the views of our modern pathologists as to the portion of the brain involved in *Rabies veri*.

It is taken from *La France Medicale*, January 8, 1879, by which paper it was copied from the Italian journal, *Gaz. delle Clin. et Gaz. Med. Ital. Prov. Ven.* For further verification it would be desirable to consult the original paper, as I found in reference to a reputed case of recovery from rabies that the experience of Dr. Offenbergh had gone the round of some foreign journals, that his name was omitted, and that of a Dr. Polli substituted, and that Polli's name was published in some Italian and French journals as the medical man who effected the cure.

Dr. Offenbergh wrote to me to correct the error, and after a correspondence with Dr. Fort, the obliging editor of *Le Paris*

<sup>1</sup> Published, 8vo., Bailliere and Co., London.

*Medical*, I traced the mistake to the original journal in which Offenberg's paper appeared.

Polli's case had, however, been circulated in the *Paris Medical, Journal d'Oculistique et de Chirurgie, du D. Fano, Paris, Journal de Liège, Gaz. Med. Ital. Pro. Ven., Lancet, Medical Times and Gazette, Medical Press and Circular*, and probably other journals. The original reference was to *Allg. Med. Berlin Centr. Zeitung*, No. II, January, 1876. Offenberg sent me the paper. There was no mention of Polli's name; the facts were identically the same.

Mistakes thus arise, and the vitality of error is so great that probably a large number believe there were two cases of recovery from rabies by the use of curara—one reported by Offenberg, the other by Polli. This instance proves the necessity of great care in accepting facts in connection with the literature of rabies.

From *La France Medicale* we learn that a woman, aged fifty-two years, was bitten on the face by a dog, about whose state of health or disease there was no question. Nine months after this bite the woman was admitted to hospital. For three days deglutition was impossible, and when she made attempts to swallow she was seized with very violent and painful cramps. She refused aliments, did not reply to questions addressed to her, held her head low and inclined to the right, whilst her eyes were half closed, and a white sticky saliva flowed from her mouth, which was drawn at the angles. Her physiognomy expressed stupor. The action of blowing on the face suddenly produced reflex action under the form of hiccough and sobbing. Her voice only produced inarticulate sounds; inspiration was frequently interrupted; and the action of showing the tongue, as well as attempts at drinking, provoked hiccough. Some drops of liquid introduced into the mouth were immediately rejected, mixed with a large quantity of saliva. These phenomena showed themselves spontaneously, or under the influence of external causes, and gave the patient an air of continual dread. Pulse 140; heart-sounds normal; pupils dilated and very impressionable to light. • Progressive aggravation of symptoms, vomiting, insensibility, death. This affection had been *diagnosed as a case of rabies of canine origin, but at the autopsy there was found, at the base of the brain, a pyriform cyst of the size of a large nut,*

*which penetrated by some lamellæ into the fissure of sylvius. The cerebral substance, softened and injected round the tumour, was depressed to give way to it.*

This tumour was full of cysticerci. The disturbed complications which marked the last days of this woman may be explained by the rapid increase of the tumour, and the movements of the contained cysticerci.

## THE PROBABLE VALUE OF CHLORIDE OF BARIUM IN INTERNAL ANEURISM,

BY F. FLINT, M.D.

I WISH to draw the attention of the profession to the action of the soluble salts of baryta on the heart and blood-vessels, and to their probable efficacy in the treatment of some varieties of internal aneurism.

In the middle of February, 1878, it fell to my lot to deal with an abdominal aneurism.

The patient was an elderly married lady, aged 65; she was not robust, on the contrary, fragile, but of such active habits in social and philanthropic work, that she perpetually overtaxed her strength; with the exception, however, of an attack of pleurisy, and an occasionally very troublesome cough, she had enjoyed very fair health: she was the mother of three children, and had had several miscarriages; she had been always temperate in every sense of the word, and during the greater number of her years had been a total abstainer from every kind of alcoholic drink; she manifested symptoms of inherited gout, and a near relation gives indications of having divided the inheritance with her.

She confessed that she had often felt throbbing in the body, and pair there, and also in the back on the left side, but she had made no complaint about the matter to her medical attendant, and fulfilled her usual social and domestic duties until she was, one day in February, 1878, attacked with severe shivering, and a sense of severe malaise. On the following morning I found her temperature  $102^{\circ}4$ , and on searching for the cause of the pyrexia I discovered a pulsating tumour, painful, situated behind,

above, and to the left side of the umbilicus ; there was a loud systolic bruit heard over the tumour, and in the course of the common iliacs ; the bruit was heard with the stethoscope in common use, and also very distinctly with Spencer's differential stethoscope, which can be used without any pressure ; there was also a bruit heard close to the vertebral column on the left side ; pressure on both external iliacs greatly increased the pulsation, and so distressed the patient, that I received a decided impression that it would not be advisable to repeat the experiment ; the throbbing was also greatly increased by any exertion, and by any excitement or emotion ; the transverse colon could be felt crossing the tumour, and when distended with flatus it gave rise to very distressing increase of throbbing. The pulse varied from 72 to 100, usually about 84 ; at the wrist it was full, compressible, but with a considerable degree of tension, and it had the same character in the carotids and iliacs. There was a moderate degree of anæmia, and a worn, distressed appearance of the countenance. No vomiting, appetite very small, digestion weak, bowels relieved by enemata ; sleep very much disturbed and scanty.

The case was seen by several professional gentlemen, and independently by Mr. J. W. Teale of this town ; they all agreed that the case was one of abdominal aneurism.

The patient was put upon Tufnell's diet, and kept perfectly at rest in the horizontal position. During this treatment and at the commencement of it, the urine was examined several times ; specific gravity usually about 1026—at first no albumen, in about one month just a trace of albumen, and after that no albumen at any examination ; at the end of two or three months of Tufnell's treatment the daily average of urine was about one pint three ounces. The temperature soon fell to normal, and there was no other cause discoverable to account for its rise ; during the progress of the case the temperature only very occasionally rose to 101°, as from any emotional excitement, and also during a distressing toothache from a necrosed tooth.

At the end of five months of this treatment, which was carried out by the patient and attendant most conscientiously and rigidly, there was no improvement in any way ; the tension of the pulse remained the same, and the throbbing of the tumour had rather

increased, so that under any excitement, as for instance, during a thunderstorm, it quite shook the bed; the sensations of the patient and my own observations began to prepare me to expect the worst.

There were reasons for abstaining from the use of large doses of iodide of potassium, so I did not try it. After careful consideration I selected chloride of barium as a probably useful remedy, and began to give it in doses of one-fifth of a grain three times a day; after three or four weeks I increased the dose to two-fifths of a grain, and with the exception of a very short trial of three-quarters of a grain, I kept to two-fifths of a grain during the remainder of its administration. Within a fortnight of the use of the chloride there was a very marked diminution of throbbing both to the sensation of the patient, and by my own observation; after five weeks use of it the patient was able to bear the removal of a necrosed molar tooth (which had for a few days given rise to neuralgia in the head and to distressing face-ache) without an anæsthetic; the tooth was, of course, not firmly fixed, but I should not have dared to allow its extraction previous to the administration of the chloride; and after nearly five months' continued use of the same remedy the tumour was so reduced that it could scarcely be felt, and only a faint systolic murmur could be heard. At the present time, four or five months since the discontinuance of the chloride of barium, there is still a slight systolic murmur, but no throbbing; the pulse is about 72, and has entirely lost its unnatural tension.

Mr. J. W. Teale has recently seen the case again, and he expressed himself highly gratified with the change in the patient's state. So that testimony can be borne by an independent trustworthy practitioner to the accuracy of the diagnosis in the first place, and to the reliability of the improvement.

It will now be interesting to examine into the *modus operandi* of the drug. According to the experiments of Boehm (Ziemssen vol. xvii, p. 377) it would appear that the salts of baryta in overwhelming doses paralyse the heart and blood-vessels; but that in more moderate doses they stimulate or irritate the heart and blood vessels, so that the pulse is made more rapid, and the blood-pressure very greatly increased. What are the doses which will produce these opposite results is not very certain.

A poisonous dose of the chloride is half an ounce; Ringer puts the dose at from half a grain to a quarter of a grain, but in the edition I have he does not state for what purpose. Hammond gives doses of three-quarters of a grain three times a day in multiple spinal sclerosis—as a nervine stimulant I suppose. I have myself taken about one grain three times a day for several weeks with a very marked stimulant effect. So that I should expect the stimulant dose to be somewhere near one grain, and the paralysing dose nearer two drachms. The dose I selected was under that which I suppose could produce a decided stimulating effect; and as a most essential improvement occurred at the beginning of the use of the salt, when I was giving one-fifth of a grain, I should not be surprised to learn that I should have done as well, if not better, by keeping to that quantity. There was no marked decrease in the rapidity of the pulse, and no sudden diminution of the impulse; the throbbing gradually subsided, and the general improvement went on *pari passu* with it. There was not any sign of a paralysing influence of the drug on the heart. I regret that I had not in my possession a sphygmograph, and that I cannot, therefore, give any sphygmographic tracings.

The drug appears to have a decided affinity to the muscular coat of the arterial system; and I imagine that it restored tone to the diseased portion of the arterial coat, and thus gave rise to consolidation of the weakened arterial wall. In my case the aneurism appeared to be fusiform rather than sacculated, and therefore deposition of fibrin could not very readily take place.

It may be said that since the chloride of barium causes an increase in the blood-pressure, it is not reasonable to expect that it should do anything but harm in a case of aneurism; no one, however, who has witnessed the beneficial effects of ipecacuanha in dyspeptic vomiting, or of arsenic in gastro-enteritis, or of cantharides in some cases of nephritis (*vide* Ringer's Therapeutics), will be deterred by the facts mentioned above from giving the chloride of barium in aneurism in an appropriate dose. Of course it may be asserted that the improvement in my case arose from the prolonged rest and rigid diet, and was only coincident with the administration of the chloride; this is quite possible, but the progress of the case did not make it appear to me at all probable.

The question of the value of the drug in aneurism can only be decided by repeated trial; and I report my case as fully as I have done, that it may be tried by others in suitable cases.

In my opinion preference should be given to the chloride of barium in fusiform aneurisms which have hitherto not been very amenable to treatment; also in the aneurisms of advanced age; and it might also be tried in any case in which iodide of potassium is inadmissible, or does not promise to be useful.

Of course perfect rest is essential to any medical treatment; and it would be well to try Tufnell's diet alone at first, and to adhere to it as far as possible during the use of the drug.

## Review.

*On Deafness, Giddiness, and Noises in the Head.* By EDWARD WOAKES, M.D. London. 8vo. pp. 143. London: H. K. Lewis.

THIS book, although small, is evidently the result of much careful thought and observation. It deals first with ear complications as a source of convulsions during dentition, and here the author points out, what many practitioners never think of, viz., that inflammation of the ear itself is the direct cause of the convulsions during dentition, although the teeth are the indirect source of them, inasmuch as it is to the irritation which they set up that the inflammation of the ear is due. He therefore recommends that, besides lancing the teeth, as is usually done, attention should be paid to the position of the head, which should be raised by a small cushion, the infant being fed with a spoon to prevent the pain from sucking. The ear should be examined, and if injected, blood should be extracted by leeches, tincture of aconite given and the ear syringed, and bromide of potassium afterwards administered. Where pus has formed, and the membrum tympani bulges, he recommends that it should be opened by a small incision.

The next chapter, on ear-cough and laryngeal complications dependent on ear disease, contains a lucid explanation, made still more clear by a diagram, of the mutual relations of the ear and larynx. The author suggests that spasmodic croup may occasionally be due to a draught of cold air; and in the *Practitioner* for January 1875, page 138, we noticed an observation made by a correspondent that colds in the head were often due to a similar cause, and might be prevented by cotton-wool worn in the ears during exposure. This remedy is so simple that we would suggest it to Dr. Woakes as a possible preventative of croup also.

In the next chapter, on giddiness from the lesions of the stomach and ear, the author discusses the vertigo *a stomacho læso*

of Trousseau, and comes to the conclusion, which Trousseau himself seems vaguely to have suspected, that giddiness is not directly due to the stomach, but to the ear, the condition of which is influenced by the general nutrition, and consequently depends more or less upon the stomach.

The fifth and sixth chapters, which deal with noises in the head and giddiness, also contain much original matter, and are succeeded by a supplementary chapter of observations on the influence of the sympathetic ganglia on disease.

We cordially recommend the work as original and suggestive, and as being likely to prove very useful in explaining both the causation of symptoms otherwise puzzling, and their appropriate treatment.

## Clinic of the Month.

**Drouot on the Diuretic Action of Squill.** (Thèse de Nancy, 1878.)—M. Drouot has studied the action of squill on the organism, and particularly on the heart, from a large number of experiments made on animals, and from clinical observations, and has inferred therefrom what the therapeutic consequences of the action will be. In a short historical sketch he shows that there are two principal categories of opinions on the action of squill, one of which maintains that it is a powerful diuretic, and the other, which represents the majority, holds that squill does not exercise any special effect on the kidneys, and only influences the urinary secretion indirectly, by acting upon the heart in a similar way to digitalis. M. Drouot is a warm advocate of the latter opinion, and bases his views on a scientific explanation. The first part of the thesis (*Rev. Méd. de l'Est*, Feb. 15, 1879) contains an account of the author's experiments on dogs and frogs, relating to the action of squill on the heart and circulation. Some of his results confirm the experiments made by Husemann, of Göttingen, while others oppose them. If squill is given in a moderate dose, the pulsations of the heart and the respiration are accelerated, but the former are less ample, and the blood-pressure sinks considerably. This is the initial stage, which has not been described by Husemann; it is followed by a second stage, during which the pulse and respiration become slower, while the blood-pressure rises to its normal level. If a toxic dose is given the blood-pressure rises immediately, while the cardiac pulsations become much slower. The second part of the thesis is devoted to a clinical study of the action of squill. We gather from it that it is a direct diuretic only in cases of dropsy originating from cardiac disease and in cachexia. It is probable that the diuretic effect is due to the action of squill on the heart, because in other dropsies which were owing to alterations of the liver and kidneys, pleurisy or articular rheumatism, the diuretic action of squill has been found to amount to almost next to nothing. (*Medical Record*, May 15, 1879.)

**The Therapeutic Value of Hydrocyanic Acid.**—

Dr. Keith Norman Macdonald calls attention to the therapeutic influence of hydrocyanic acid in arresting the night cough of children after failure with the bromides. He has lately demonstrated its beneficial effects in a case in which it completely arrested a cough of sixteen months' standing in forty-eight hours. The patient, a child four years of age, suffered from night cough, for the relief of which bromide of potassium and ammonium and change of air had been in vain prescribed. At length the following mixture was administered:—

R. Acidi hydrocyanici dil. . . . ℥viii.  
 Syrupi. simplicis . . . . fl. ʒij.  
 Aquæ distillatæ . . . . fl. ʒij. M.  
 Fiat mist. Sig., one teaspoonful every four hours.

The first few doses did not appear to produce much effect, so the dose was increased to a teaspoonful and a half every three hours when necessary. The good effects of the remedy became at once apparent, especially in the night attacks. It was particularly noticed that when a paroxysm of cough came on it ceased suddenly and unexpectedly five minutes after each dose. Within a week a cure had been effected, and the patient now appears to be in the full enjoyment of robust health. (*The Edinburgh Medical Journal*, May, 1879.)

**Gelsemium in Neuralgia.**—Professor Massini, of Basel, recounts his experience of the use of this drug in the treatment of eighty cases of neuralgia of the trigeminus. He prefaces his remarks with a brief description of the physiological action of the drug. Redness of the conjunctiva, pain in the eyelids, contraction of the pupils, double vision, and giddiness, are the symptoms which generally follow the administration of moderate doses. When the dose is increased, slight ptosis, dilatation of the pupil, gasping, languor, and pain in the limbs, are the usual results. The respiration is not affected. In frogs, on the other hand, a large dose produces paralysis of the respiratory muscles, the heart's action remaining unchanged. In cases of neuralgia of the trigeminus, Dr. Massini gives twenty minims of the tincture every half hour up to three doses, and he finds that the first dose generally affords relief, and that the pain rapidly subsides after a second or a third dose has been taken. He has never found it necessary to exceed sixty minims, and only in one case did this quantity produce unpleasant head symptoms. The cases in which the remedy produces most benefit are those of simple rheumatic neuralgia of the alveolar branches of the trige-

minus; in those it rarely fails. It also sometimes relieves the pain remaining after the stoppage of a carious tooth. When there is any inflammatory affection of the bone or periosteum, no good can be expected from the remedy. The medicine may, if necessary, be repeated several days in succession, the active principle rapidly passing off by the kidneys. (*Dublin Journal of Medical Science*, May, 1879.)

**The Therapeutic Administration of Lime Salts.**—There has been discord between chemists and physicians on the subject of the administration of lime salts; the chemists denying the possibility of any general action on the system, and practitioners considering that this action is sufficiently demonstrated by the valuable effects of the prolonged employment of phosphate of lime or of calcic mineral waters. Perl has endeavoured to solve the problem by experiments, which he details in the German *Archives of Pathological Anatomy*. He administered to a female dog a fixed quantity of very dilute chloride of calcium and minutely analysed the urine and fæces. Without entering into the detail of these difficult experiments, it may be enough to say that the salt administered is decomposed in such fashion that the chlorine appears in the urine, and the lime in the fæces. It results, therefore, from the experiments of Perl that, under the conditions of the experiment, there is a very slight absorption of the lime salt, which, if accepted, puts an end to the discussion and answers the chemical objections, while it justifies the employment of a method of treatment which has been from time immemorial employed by practitioners in rickets and tuberculosis. (*The British Medical Journal*, May 24, 1879.)

**The Treatment of Unhealthy Local and Syphilitic Sores by Immersion.**—Mr. Cooper gives the following method of treatment for phagedænic and other ulcers. The patient sits in an ordinary hip bath, containing sufficient water to ensure constant submersion of the affected part, for eight or ten hours a day. If the disease be in the groin, a full-sized bath in which the patient can recline may be necessary. The temperature of the water is regulated by means of a thermometer, and is kept as near 98° F. as possible by the removal and addition of small quantities of water at frequent intervals, without disturbing the position of the patient, and in winter the bath is placed near a fire. The exposed parts of the body are covered with blankets, whilst the more prominent parts are protected by air or water cushions. In the evening finely powdered iodoform or other dressing is applied and the patient goes to bed as usual. Next morning the dressing is allowed to separate in the bath; the pain attending its removal being thus avoided. The bath is repeated

day after day as long as may be necessary, general treatment according to the nature of the sore being carried on at the same time. A good purge is beneficial at the outset, followed by iron, quinine, or ammonia and bark with opium, in local sores, and by appropriate specific remedies when the patient is syphilitic. A liberal diet with plenty of milk, and little or no alcohol, answers best as a rule. Though men are here only referred to, it need hardly be said that the same treatment is equally applicable to women. The bath is to be continued for at least a day after the ulcerated surface has become quite healthy, though its use may often be protracted with excellent effect until the sore has nearly or quite healed. Some of the advantages of immersion are, its effect in nearly always quickly relieving, and often in removing entirely, the severe pain attending phagedæna. Caustics are very rarely required. The ulcer is kept clean and free from discharge, without pain or trouble. When a wound has to be made by the surgeon its edges hardly ever become inoculated. The pain caused by frequent change of dressing is altogether avoided. The materials necessary for immersion being only those usually to be found in every house, it can be equally well carried out in private as in hospital practice. In the majority of cases of unhealthy ulceration and sloughing, whether local or syphilitic, immersion appears to be the best and most speedy, as it is certainly the least painful of the modes of treatment hitherto adopted. (*The Lancet*, May 24, 1879.)

**Menthol a New Antiseptic.**—Menthol, or peppermint camphor, is a crystallisable body deposited from Chinese oil of peppermint on exposure to cold. It is met with in the form of small, colourless, fragrant, prismatic crystals, not unlike sulphate of magnesia. In fact, when first imported from Japan some twenty years ago, it was for a time suspected to be nothing but Epsom salts flavoured with peppermint. It is now known to have a definite chemical composition and to be the camphor or stearoptine of peppermint oil. It is but slightly soluble in water, although it imparts to it its characteristic smell and taste. It dissolves readily in alcohol and ether, and in oils both fixed and volatile. It melts at about the temperature of the body, and when further heated volatilises without decomposition. Mr. Archibald Duncan, of Edinburgh University, has recently undertaken a series of experiments, from which it would appear that menthol is possessed of antiseptic properties similar to those of its homologue thymol. At present it can hardly be regarded as a commercial article. Strong oil of peppermint painted over the part has long been a favourite mode of treatment in China for gout and neuralgia. The Japanese "po-ho-yo," or neuralgia remedy, probably contains menthol. (*Ibid.* June 7, 1879.)

**Treatment of Neuralgia by Sulphate of Copper.—**

At a meeting of the Académie de Médecine in Paris, M. Féréol read a paper upon the good results to be obtained in cases of neuralgia of the fifth pair of nerves by the use of the ammoniacal solution of copper sulphate. Although the cases in which this method of treatment had been employed were not numerous, being but six in all, of which four had occurred in M. Féréol's own practice, they were still of importance, because the neuralgia was, in nearly every case, of long standing, had resisted all other therapeutic means, and presented the characters of facial tic-doloureux. The disappearance of the pain was instantaneous, and although the painful phenomena might not have entirely vanished, still the improvement was very marked. The average dose of the medicine was 0.10—0.15 per day, which could be raised gradually to 0.30—0.50. It could be given in the form of pills, in which case it was found necessary to break up the dose into eight or ten pills, one of which was to be taken every hour or two, preferably at meals. The sulphate of copper should be continued for twelve or fifteen days at least to prevent any relapse. (*Arch. Gén. de Médecine*, May, 1879.)

**Treatment of Acne.**—Dr. Gage Parsons believes that Mr. Erasmus Wilson was the first to propose sulphur lotion in acne punctata. The usual lotion of flower of sulphur with glycerin and water is undoubtedly a valuable remedy; but from the readiness with which the sulphur separates it is inelegant and inconvenient, whilst it is not quite satisfactory in its results. A far more efficacious mode of using sulphur is to dust the face with pure precipitated sulphur every night, with an ordinary puff used for toilet purposes. This will usually effect a cure in about a week. Recently two severe cases of acne, of two years' standing, which had resisted the ordinary methods of treatment, yielded at once to sulphur thus applied. If the sulphur be scented with oil of lemon or roses, it will form an elegant cosmetic. (*The British Medical Journal*, June 7, 1879.)

**Diffuse Inflammation of the Liver from Phosphorus.**—In a paper reprinted from the *Deutsches Archiv. für Klinische Medizin*, Dr. Anspecht describes experiments made upon rabbits by injecting a solution of phosphorised oil (one in eighty) into the subcutaneous tissue of the back. Three milligrams was the dose thus administered at each injection. Twenty-one animals were experimented upon, and of these thirteen died after one injection, two after two, three after three, and the rest after four, five, and nine. The conclusion arrived at is this: Phosphorus, or some modification of it produced in the blood leads to a series of chemical changes in the liver cells, with the

formation of albuminoid granules and fat grains in their protoplasm, but the liver cells are not destroyed. If the subject of the experiment does not die in consequence of these changes, then the liver cells become completely restored. If the phosphorus be administered in too frequently repeated doses, the albuminoid grains and fat granules are no longer formed, but the cells become pale, and glassy, with distinct nucleus, and the interstitial tissues become diseased. The changes observed are compared with those which ensue in the kidney when the ureter is ligatured, and are found to be very similar. The conclusion derived from a review of both sets of experiments is that in either case a parenchymatous inflammation is the primary change; that when the obnoxious element causing this, which may be of various kinds, is at work sufficiently long or sufficiently often to hinder the speedy resolution of the inflammation, secondary changes follow in the interstitial tissue, and an intestinal inflammation is started. (*The British Med. Journ.*, June 7, 1879.)

**The Internal and External Action of Thymic Acid and Thymate of Soda.**—Dr. Alvin has for more than a year substituted thymic for carbolic acid in preparations which are used to produce a caustic, substitutive, or simply astringent action upon the mucous membranes of the larynx and pharynx. The solutions thus prepared are much better borne, and are at the same time much more active than those at present in use, and have given the most satisfactory therapeutic results. Thymic acid has the same curative properties as carbolic acid, and has a more pleasant smell. Some of the formulæ, which extended use upon a large number of patients has shown to be capable of giving good results, are here appended. Solutions for painting the parts may be made as follows:—

1. (a) Crystallised thymic acid, 1; pure glycerin, 2-4. (b) Crystallised thymic acid, 1; iodine, 1; potassium iodide, 1; pure glycerin, 5-15.

2. Substitution solutions: (c) Crystallised thymic acid, 1; pure glycerin, 50; (d) Crystallised thymic acid, 1; iodine, 1; potassium iodide, 1-2; pure glycerin, 120; (e) Crystallised thymic acid, 1; tannin, 1; pure glycerin, 100.

3. (f) Astringent solutions: Crystallised thymic acid, 1; pure glycerin, 50.

4. (a) Pastilles: Thymate of soda, one milligram. To make a pastille of one gram.

For superficial stomatitis; irritation of the tract; softening of the mucous membrane in smokers; they are very efficacious in cases of spasmodic cough. They have also been tried in whooping cough.

(b) Thymate of soda, one milligram; chlorate of potash, ten centigrams. For a pastille of one gram.

In severe stomatitis, tonsillitis, and pharyngo laryngitis.

(c) Thymate of soda, 1 milligram; borax, 10 centigrams. For a pastille of 1 gram.

Ulcerated stomatitis and tonsillitis.

The pastilles should be taken in doses of six to ten a day. They are calculated to remove the putridity of the parts which they are destined to cure.

5. Drink: Thymate of soda, 1-4 centigrams; simple syrup, 61 grams; water, 100 grams. To be taken in twenty-four hours.

This preparation has been invariably used with success in affections of the lungs, the cough being lessened and the expectoration modified.

In cases of catarrhal bronchitis the disease has always been lessened in duration, and has been occasionally abated. Without stating that it is efficacious in whooping-cough, Dr. Alvin believes that it will be found to be useful in that disease, judging from the effects produced on the few patients upon whom he has tried the remedy. Thymic acid has also been employed for inhalation, and in aqueous solution for cases in which naso-pharyngeal irrigation was indicated. It is also recommended as an exceedingly valuable modificatory agent. Thymic acid often contains impurities, and it is to obviate this imperfection that the crystallised acid is ordered. Thymate of soda is a very unstable salt, and requires great care in its preparation. Thymic acid, which is a powerful caustic, has hitherto been prescribed in too large doses (1 gram to 1.50 grams in twenty-four hours). Thymic acid was used in 1866 by Giraldes in the treatment of wounds. (*Le Progrès Medical*, May 31, 1879.)

## Extracts from British and Foreign Journals.

**Diabetes Mellitus cured by Extract of Nux Vomica.**—Two cases are reported by Dr. Eug. Zarzana in the *Gazzetta Medica di Roma*. The first patient, a woman, had been passing a very large quantity of water for three years; she was very weak, her sight was affected, and her thirst was great. At the time the treatment was commenced, she was passing twelve Roman livra of urine in the twenty-four hours; it was not albuminous but contained a large quantity of glucose. At first she was given daily three-quarters of a grain of the alcoholic extract of nux vomica dissolved in three ounces of distilled water, and the dose was increased by three-quarters of a grain every three days, until she was taking  $4\frac{1}{2}$  grains per diem. Under this treatment the quantity of urine diminished, and it became very acid, flocculent, and coloured by biliary pigment. At the same time the glucose diminished, until only traces of it could be discovered. The general symptoms improved—the patient was restored to her previous good health. The second patient was a robust man, seventy-two years of age. For eleven years he had passed two Roman livra and eight ounces of urine, which was rich in urates and albumen. Under the use of the nux vomica, the glucose gradually diminished in quantity and finally disappeared entirely. (*The Doctor—The Canada Lancet*, Jan. 1, 1879.)

**Hypodermic Injections of Coffee.**—Dr. Pallen of New York has had occasion to inject a solution of coffee subcutaneously in two cases. In the first the patient was a lady, aged 34, who suffered from uterine troubles, the pain of which was only controlled by the use of morphia. The drug, however, caused vomiting which lasted as long as any morphia remained in the system. To control the vomiting, Dr. Pallen administered a warm hypodermic injection of 20 ℥ of the fluid extract of Java coffee into the epigastrium. Fifteen minutes afterwards the patient, who had previously been seriously prostrated, expressed herself as decidedly better, having vomited but once during that time. An

additional injection of the same amount was then made into the abdominal parietes. She was free from nausea in less than an hour, and never vomited after the second injection of coffee. In the second case the patient was a confirmed morphia-eater who had taken an overdose. Thirty minims of coffee were injected into the skin above the epigastrium, and after an interval of fifteen minutes a second injection of the same amount was administered in the right arm over the deltoid. In two hours no symptoms of morphine could be detected. In the first case there were no ill effects from the hypodermic injections; but in the second one a very considerable abscess made its appearance in the shoulder, as well as inflammatory indications in the epigastrium. Dr. Pallen explains this on the ground that in the first case the extract had been warmed to the temperature of the body, whilst in the second it was cold. He also states that he has been in the habit of warming all solutions before administering them in the form of subcutaneous injections, and that he has in such cases never seen an abscess follow from their use. In other cases, however, when from hurry or other reasons it has been impossible to warm the solutions, he has not unfrequently seen cold hypodermic injections produce irritation, inflammation, or abscess. (*The New York Medical Record*, Dec. 21, 1878.)

**The Action of Ergot.**—Dr. Peton has studied experimentally and clinically the physiological and therapeutic action of ergot. The experiments have led him to conclude that ergot has a direct elective action upon unstriated muscular fibre. If it is desired to obtain its action rapidly upon a given organ, the drug must be injected hypodermically in the neighbourhood of that organ, since its effects take some time to develop after administration by the mouth. Ergot does not act solely upon the muscular fibres of the uterus, as it affects also the muscle of the bladder and of the vessels. Ergotised rye, which is most generally employed for obstetric purposes, is also of great use in metorrhagia, hæmorrhage from the alimentary canal, hæmoptysis, and epistaxis. Dr. Peton believes that the activity of different solutions is very variable, and that a solution which contains a gram of ergot in a cubic centimetre of fluid is the most useful preparation. (*Le Progrès Médical*, May 10, 1879.)

**The Physiological Action of Platinum.**—Platinum is one of the metals whose action on the living organism we know very little about. Therapeutically it is at present nowhere. And yet some recent researches made by Herr Kebler at Strasburg show that its properties are in some respects peculiar. The salt used in these experiments was the double chloride of platinum and sodium, a solution of which containing 0.050 platinum in one

cubic centimetre was injected in varying quantities under the skin of frogs and into the veins of warm-blooded animals. In frogs, three to fifty milligrams of the metal first caused increased general reflex irritability, and then the voluntary movements became paralysed, while spontaneous convulsive twitchings of the limbs or of certain groups of muscles occurred, which ceased on division of the medulla oblongata. In rabbits, twenty-five to fifty milligrams of platinum, and in dogs forty-five to ninety-five, caused profuse diarrhoea when injected into the jugular vein. In dogs, blood generally appeared in the motions, and vomiting was not uncommon. Hyperæmia of the mucous membrane of the stomach and intestine occurred in rabbits, but in dogs all the abdominal viscera were hyperæmic, even the nerve-trunks being involved, while the digestive mucous membrane was softened and infiltrated with blood. The bladder of dogs poisoned with large doses of platinum was sometimes ecchymosed. The action of the salt on the circulation mainly showed itself in a continuous fall in the blood-pressure, with scarcely any alteration in the frequency of the pulse. This fall appears to depend entirely on dilatation of the blood-vessels, especially those of the abdomen, owing to paralysis of the terminations of their peripheral nerve-fibres. The excessive stagnation of blood in the abdominal vessels, due to their dilatation, Kebler regards as the cause of the morbid phenomena occurring in the digestive tract. He is also inclined to refer the nervous symptoms met with in frogs, in part at least, to the vascular dilatation, though unable to exclude the possibility of a direct action of the platinum on the central nervous system. We record these experiments without suggesting in what way they may be made therapeutically serviceable. One thing, however, seems clear, that the peculiar action of platinum was scarcely likely to prove of much value in the treatment of syphilis, the disease in which it has as yet been chiefly tried. (*Med. Times and Gazette*, Feb. 8, 1879.)

**Treatment of Asthma by the Hypodermic Injection of Morphia.**—In several articles contributed to *L'Union Médicale*, July and October, 1878, Dr. H. Huchard has strongly advocated the use of subcutaneous injections of morphia in cases of asthma. Having found that it causes marked relief in the spasmodic efforts at respiration, he argues that it exerts a special influence on the respiratory system. On this hypothesis he pursued its application in other affections where the difficulty of respiration becomes a troublesome symptom, namely, in aortic disease, accompanied with cerebral anæmia, phthisis, and uræmia. Four well-marked cases of relief of laboured inspiration, associated with intestinal nephritis, are carefully detailed. Dr. Huchard

thinks that the hypodermic injection of morphia cannot be replaced by opium preparations or by morphia introduced into the alimentary canal. When carefully injected, the morphia causes no serious inconvenience, 0.003 to 0.005 grains are first used, and the dose is gradually increased to 0.01 or 0.015 grains at the most for each paroxysm. Morphia relieves dyspnoea not so much by its hypnotic action as by its direct action on respiration, for clinical experience establishes the fact that it facilitates respiration. By the use of morphia, the pain is relieved, the general system is thereby benefited, and the disease is thus probably modified. (*The Chicago Medical Journal and Examiner*, Jan. 1879.)

**Treatment of Traumatic Tetanus.**—Dr. Panthel reported a case three years since in which he treated traumatic tetanus successfully by the administration of hydrate of chloral and potassium bromide. He has lately had a similar case. A badly-fitting shoe had caused trismus and tetanus. Every two hours two grams of chloral hydrate and potassium bromide were administered alternately. A marked diminution of the symptoms occurred in twenty-four hours, but a complete cure was only effected after a period of six or seven weeks. There was frequently pain in the intercostal spaces. In the first fortnight the patient had received ninety grams of the two medicines. (*Berliner med. Wochenschr.*, No. 43, 1878; *Centralblatt für Chirurgie*, No. 10, March 8, 1879.)

**Changes in the Spinal Cord and peripheral Nerves in Old Stumps.**—Drs. Déjérine and Mayer have investigated the changes which occur in the spinal cord and peripheral nerves in the stumps after amputation. They have examined the following cases: amputations of the thigh after 17, 22, 23, and 30 years; disarticulation of the shoulder-joint after 40 years; two amputations of the lower part of the thigh after 4 and 9 years; and an amputation of fore-arm in its upper third after 5 years. The results arrived at agree generally with those of Vulpian, viz.: atrophy of spinal cord on the side corresponding to the limb which had been removed. The alterations in the nerves in the stump could not be traced to the spinal cord, the atrophy of the spinal cord therefore is functional, and is not dependent upon an inflammatory action extending from the nerves of the stumps. (*Gaz. méd. de Paris*, 1878, Nos. 39, 40; *Centralblatt für Chirurgie*, March 29, 1879.)

**On the Treatment of Chorea.**—Dr. Hayden believes that the attack is in most cases directly traceable to fright or other emotional excitement of a depressing character, operating upon

a nervous and feeble constitution, at a period of life when the receptive faculties are most sensitive. He therefore concludes that phosphorus and strychnia combined—the former a nerve nutrient of recognised value, and the latter a nerve tonic of great potency—may prove efficacious in the treatment of chorea. As yet, his experience of this plan of treatment has been very limited, extending only to three cases, but so far it has been eminently satisfactory. The strychnia and phosphorus were administered in 3 ℥ doses of the liquor and ethereal tincture, thrice a day, so that the total amount of each drug given was 9 ℥. The patients were children of nine to eleven years of age. (*The Dublin Journal of Medical Science*, Jan. 1879.)

**Warburg's Tincture and its Therapeutic Value in Indian Fevers.**—Dr. Owen states that Warburg's tincture is a remedy of great value in remittent fever—in some cases preventing a return of the exacerbations; in others, and these the most numerous, diminishing the intensity of the exacerbations, and rendered the remissions distinct, thereby lessening the force of the fever, and opening the way for the subsequent beneficial action of quinine. In bad cases of intermittent fever it often acts as a charm, in some cases dispersing the paroxysms, not to return; in others diminishing their force and lessening their duration. It also appears to act on the fever *per se*, at the same time increasing the subsequent beneficial action of quinine in a marked degree. It may be administered with perfect safety by competent hands to children as well as to adults. Moderate perspiration produces as good results in these cases as does excessive sweating, and can, if necessary, be repeated by repeating the dose. The excessive perspiration and consequent debilitating effects may be prevented by regulating the dose. And lastly, he finds that in remittent fevers of a typhoid type with high temperature this medicine may be administered with great advantage, care being taken that the dose and subsequent perspiration be not excessive, and that any symptoms of debility be combated with stimulants. (*The Dublin Journal of Medical Science*, Jan. 1879.)

**An Antidote to Poisoning by Phosphorus.**—A successful antidote to poisoning by phosphorus has been recently discovered by two French physicians. The remedy consists in the slow and gradual injection of oxygen into the veins. The *modus operandi* is as follows:—Phosphorus has a great affinity for oxygen, and accordingly, when absorbed into the system, its injurious effect is due to the fact that it unites with the oxygen in the tissues, thus producing dangerous or fatal symptoms. Accordingly, by the introduction of oxygen into the veins,

the phosphorus is oxidised, and prevented from robbing the blood-corpuscles of their oxygen, which would otherwise be the inevitable result. The operation of injecting the oxygen being inexpensive, and presenting no difficulty to the medical practitioner, we may expect to see this remedial method generally adopted in cases of poisoning by phosphorus. (*The Canada Lancet*, vol. xi., No. 6, 1879.)

**Treatment of Scrophulosis by Tayuya.**—Starting from the idea that scrofula is allied to syphilis as well as to tuberculosis, Dr. Alpagonorello was led to try in the first-named disease the tincture of tayuya, which had been employed with success by Dr. Faroani in the treatment of syphilis. The results hitherto attained have been very satisfactory. He administered it internally in doses of from two to ten drops a day in several chronic cases of hypertrophied and suppurating glands, employing it at the same time externally as a lotion in the proportion of four parts of the tincture to two hundred of water. Within a few weeks the wounds had healed, and the general health of the patients had greatly improved. The remedy deserves further trial, as it possesses a great advantage over cod-liver oil in having no unpleasant taste or smell. (*Allg. med. cent. Zeitg.*, Nov. 2, 1878; *The New York Med. Record*, Jan. 18, 1879.)

**Yellow Oxide of Mercury in Diseases of the Eye.**—Dr. Reuling finds that the yellow oxide of mercury is superior to calomel in the treatment of certain diseases of the eye. It is chiefly of use in superficial inflammatory affections of the cornea, uncomplicated with iritis, whether of a scrofulous or syphilitic origin; in keratitis phlyctenulosa, conjunctivitis phlyctenulosa, keratitis and conjunctivitis pustulosa, and in keratitis and conjunctivitis lymphatica. It is also a most successful agent in superficial ulcers of the cornea, when combined with other remedies. The oxide is used in the form of a salve, consisting of 8—10 grains hydrarg. oxid. flav. to the half-ounce of simple cerate. About as much as a small pea is introduced between the eyelids of the patient; the eyes are then closed tightly, and the ointment is rubbed along the cornea and sclerotic by means of a handkerchief, the remains of the ointment being removed in about half a minute to prevent any subsequent irritation. The method of preparation of the ointment is as follows: the necessary quantity of mercury oxide is placed in a mortar, and the granules are perfectly divided with a drop of olive or sweet-oil. After the requisite subdivision has been made, and a fine powder remains, the cerate is added, and is well impregnated with the powder by means of the pestle. It is from the fact that the subdivision of the granules is greater, and that the

operation is more readily performed, that Dr. Reuling claims for the yellow oxide a superiority over the red variety. The same remedy in a weaker form has also been found to be useful in the disease known as blepharitis ciliaris orb. marg. (*Virginia Medical Monthly*, Nov. 1878.)

**A Contribution to the Therapeutics of Migraine.**—Dr. Seguin, in the treatment of migraine, eliminates all psychic stimuli so far as is possible. He also orders alkalies, and in anæmic cases iron and cod-liver oil, whilst he prohibits the use of carbohydrates and flour. During the attack he recommends rest, with deprivation of light and food. In cases in which the attack is anticipated, he relieves it by the administration of the fluid extract of paullinia sorbilla—two teaspoonfuls in the course of 1—2 hours, or the powder of the same plant, 20—30 grains every half-hour; coffeein, 2 grains hourly repeated three or four times, or croton-chloral, 15—20 grains repeated about four times, are also useful. Subcutaneous injections of morphia or atropin are disapproved of, although they may occasionally be of use. The treatment in the intervals between the attacks consists in the administration of alcoholic extracts of cannabis indica to the extent of  $\frac{1}{3}$  grain daily before each meal. This dose may be increased after some weeks to  $\frac{1}{2}$  grain, and in men to  $\frac{2}{3}$  grain. The pills are to be taken on an average for about three months. The author places the means here mentioned in relation to their action in migraine upon the same footing as potassium bromide in epilepsy. (*Centralblatt für die med. Wiss.*, January 11, 1879.)

**On the Application of Clysters of Chloral Hydrate.**—Dr. Starcke suffered from chronic catarrh accompanied by great acidity of the stomach, the most troublesome symptom being sleeplessness, which allowed the patient only half an hour to an hour's rest. At the recommendation of his colleagues Dr. Starcke determined to make use of hydrate of chloral, but from the irritable condition of the stomach he was unable to take it by the mouth, and was therefore obliged to inject it per rectum. For this purpose a watery solution of five per cent. strength was warmed to 35°, and ten grams were injected. After a few minutes an agreeable feeling of warmth was perceived, and he soon fell into a deep sleep which lasted for five hours. From this time the clysters of chloral hydrate were employed for five months, during which 120 grams of the drug were used. After the first dose an improvement in the condition of the patient occurred, and the appetite returned without the usual headache. The action of the chloral underwent no diminution, and the dose of 50 centigrams was effectual to the last. Dr. Starcke

concludes, from these results, that the administration of hydrate of chloral in the form of clysters is an effectual remedy in the treatment of irritability of the stomach. He recommends, moreover, that the canula of the syringe should be well oiled, that it should be introduced beyond the sphincter, that the solution should be warmed to the temperature of the body, and that a smaller dose should be given than would have been administered by the mouth. (*Medicnisch-chirurgische Rundschau*, January, 1879.)

**Nasal Catarrhs and their Treatment.**—Nasal catarrhs may be divided into the three varieties—congestive, secretive, and ozænic. The congestive occurs more particularly amongst children. In this form of catarrh the dietary must be carefully attended to, whilst hydrargyrum, kalii iodidum or syr. ferri iodidum, and oleum morrhuæ, are to be administered internally. The parts may be relieved by the application of ammonii chloridum, solutio Fowleri, and by the vapour of iodine, or by painting with glycerine, pure or united with tannic acid in the proportion of 10-20-30 grains to  $\mathfrak{z}$ i of glycerine. These applications are, however, only palliative, and internal medication, with plenty of out-door exercise, and tonics generally, are to be mainly relied upon. In the treatment of both congestive and ozænic catarrh, cleanliness is the first requisite. For this purpose Dr. Tansley thoroughly cleans out the nasal cavities with the help of a probe and some cotton-wool, picking away the inspissated mucus, and then making use of the syringe to complete the process. Local applications are then resorted to, the solutions which are in most general use being alumen, acidum tannicum, zinci sulphas, argenti nitras, &c., with or without glycerine. Powders are also available, such as iodoform, bismuthi subnitras with morphia, or pulvis cubebæ, or argenti nitras. The general treatment is well understood, but it may be added that such medicines as act upon the mucous membrane—âs, for instance, potassic and ammonium chlorides, turpentine, cubebs, arsenic, &c.—may be used with advantage. Of the preparations of cubebs, the oleoresina seems preferable, given in doses of gtt. 10-20 on sugar. (*The New York Medical Journal*, August, 1878.)

**Subcutaneous Injections of Morphia in the Treatment of Diabetes Mellitus.**—Prof. Pecholier, in 1865, called attention to the effect of opium in diabetes, at the same time promulgating a theory as to the action of the drug in this disease. According to this author, opium is a so-called retrenching agent (sparmittel), for it produces a “catalepsy of the nutritive functions,” and it is for this property that its administration is

beneficial in cases of diabetes. A serious drawback to the use of this remedy exists, however, in the fact that it gives rise to gastric disturbances. The medicine may be incorporated with the organism, however, in another way, viz., by subcutaneous injection. As an example of the mode of action of the drug when given by this method, a case is related of a diabetic patient who occasionally suffered from sciatica, in whom a single injection of 0·04 mur. morph. with ·5 milligram of atropia was followed by a marked diminution in the quantity of urine. After five injections the sciatica was cured, and the elimination of urine had returned to the normal. The patient was then ordered a strengthening régime (meat diet with alkalis given internally). The author concludes with these words: "The favourable action of opium in diabetes mellitus no longer stands in need of proof; it only remains to show whether the hypodermic injection is the best method of administration." (*Bul. gén. de thérapie, médic. et chirurg.*, 1878. 10 *Heft: Med. chir. Rundschau*, January, 1879.)

**Iodoform as a Local Anæsthetic.**—In a recent article in the *Wiener Med. Wochenschrift*, Dr. Moleschott says that he has often relieved the most intense gouty pains, and other symptoms of gouty inflammation, within twenty-four hours, by painting with collodion. In the rheumatic pains it is efficacious, but in the various neuralgic affections (intercostal, sciatic, &c.) it succeeds excellently. Unfortunately iodoform has a disagreeable smell, which makes those who use it objectionable to others. To obviate this, Moleschott advises that the glass vessel containing the iodoform preparation (collodion, or what he uses, ointment) be kept outside the window in a leaden box provided with a well-fitting cover, the opacity of the box having the additional advantage of retarding the decomposition of the iodoform by light. The part anointed with collodion is also to be covered with gutta-percha tissue, and, if possible, the iodoform is only to be applied at night, so that most of it is absorbed, or has evaporated, before the morning, and what remains (if the ointment is used) can easily be removed with soap and water. The use of iodoform sometimes causes cardiac palpitation, but Dr. Moleschott has also more than once found a weak, irregular pulse rendered stronger and more regular by small internal doses of iodoform, just as occurs after the administration of small quantities of digitalis. (*The Canada Medical and Surgical Journal*, January, 1879.)

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## Department of Public Health.

### THE RELATION OF PROTECTIVE VACCINATION TO THE DEVELOPMENT OF THE VESICLE.

At the meeting of the Epidemiological Society on the 4th June a highly suggestive and interesting paper was read by Dr. Robert Cory, the Assistant Obstetric Physician at St. Thomas's Hospital, and Departmental Examiner in and Teacher of Vaccination under the Local Government Board, giving the results of certain experiments made by him, and designed to ascertain the degree of effect exercised upon the system by vaccination at different stages of development of the vaccine vesicle. The experiments were made on infants with supernumerary fingers, opportunity being taken to inoculate the supernumerary finger with vaccine virus at a particular date before its removal, and subsequently to test the effect of this vaccination upon the system of the infants by proceeding to vaccinate in the ordinary way. The experiments were only four in number, and we proceed to give them in detail:—

*Experiment I.*—Eliza Page was born in Southwark with a supernumerary thumb. This additional thumb articulated with the metacarpal bone, and hence had a broad attachment with the hand.

On the 21st of April, the child then being seven weeks old and in good health, Dr. Cory vaccinated it on the tip of the thumb with lymph taken in a tube on the 11th of April.

On the 23rd, 49 hours after vaccination, there was slight redness about the points of inoculation.

On the 24th, 60 hours after vaccination, the redness was more marked, but as yet there was no appearance of a vesicle.

On the 25th, 85 hours after vaccination, the inoculated places were distinctly vesicular.

On the 26th, 108 hours after vaccination, the vesicle had increased in size and an areola was present, but this did not extend to the hand.

It as at this stage of the development of the vesicle that the thumb was amputated by Mr. Mason.

For the next three days an inflammatory blush was present over the hand; this subsided on the tenth day from vaccination, and the wound afterwards healed rapidly.

On the 30th of May, 1877, *i.e.* 39 days after the first vaccination on the thumb, Dr. Cory vaccinated the child in five places on the left arm directly from another child. This vaccination did not take. Dr. Cory therefore again vaccinated the child on the 6th of June, which was also done directly from another child, with no better result.

As Dr. Cory's experience in arm to arm vaccination since the beginning of 1876 has been four failures in about 3,000 cases, and as he has never failed to vaccinate on a second attempt, he thinks himself justified in assuming that this child received full protection from the first vaccination.

*Experiment II.*—After this case Dr. Cory had no further opportunity of experimenting until the 15th of January, 1879, when Mr. McKellar sent him a child unvaccinated, and having a supernumerary thumb similar to the one just described.

The child was vaccinated on his supernumerary thumb on the 15th of January, 1879, being then five weeks old, directly from another child.

On the 18th there was no evidence of the vaccination having taken, and the thumb was accordingly re-vaccinated on this date from a tube taken on the 15th of January.

On the 20th, when Dr. Cory again saw the child, he felt certain the first attempt to vaccinate the thumb had failed, but was uncertain about the result of the second. Eczema existed behind one ear, which the mother stated first appeared on the 18th, after Dr. Cory's visit.

On the 22nd Dr. Cory found neither place had taken, and as the eczema was worse he postponed further attempts to vaccinate the thumb until this had cleared off,

On the 15th of February the eczema had entirely disappeared, and Dr. Cory again vaccinated the thumb with lymph taken in a tube on the 12th of February, making three insertions with a grooved needle as remote as possible from the hand.

On the 19th of February, 96 hours after the vaccination, the three places had all taken and were vesicular. He accordingly removed the thumb, taking precautions not to injure the vesicle, for otherwise the stump might have been inoculated with the lymph contained in it.

On the 22nd the wound was doing well, an area of inflammation was present on the hand, which was not present, as was stated by the mother, on the preceding day.

On the 25th the sutures were removed. The area of inflammation was then declining.

On March the 5th the wound was healed. The mother was then told to bring the child up in a month to be vaccinated at St. Thomas's Hospital; but as she had not done so by the 15th of April Dr. Cory called to see her, and found that she had had the child vaccinated on the 8th of April by Mr. Pinder, of Camberwell.

On looking at the arm on this, the eleventh day after vaccination, he found four small brown scabs, quite dry, and almost ready to fall. The areola, which it was stated had been very extensive, had quite subsided. He also learnt that the redness began to come very soon after the vaccination, and that when she took it to the station on the 15th it extended to the elbow.

In this case the early and extensive areola, its early subsidence, and the rapid dying of the scabs, all indicated the rapid progress of the vaccination.

*Experiment III.*—The third case Dr. Cory met with had, like the other cases, a supernumerary thumb.

On the 22nd of January the thumb was vaccinated directly from the arm of another child.

On the 25th of January, 72 hours after vaccination, there were distinct evidences of the vaccination having taken. Dr. Cory therefore removed the thumb.

On the 26th there was no appearance of inflammation about the hand.

On the 27th there was slight inflammation at the lower angle of the wound.

On the 28th the inflammation was a little more extended.

On the 29th the inflammation was still more extended.

On the 30th the extent of the inflammation was about the same as on the 29th. The union of the wound was complete, and the sutures were therefore removed. From this date the redness declined.

On the 19th of March Dr. Cory vaccinated the child in five places on the arm directly from another child.

On the 26th all five places had taken. The areola, which commenced early on the preceding day, was apparently at its height on this, the eighth day.

On the 28th, which was the tenth day after vaccination, the areola was subsiding. There was an enlarged gland in the corresponding axilla.

On the 3rd of April two of the scabs fell, and the other three fell on the following day, which was the seventeenth day from the vaccination.

In this case the course of the vaccination was rapid, though not so rapid as in Experiment II., in which the finger was removed on the fifth day.

*Experiment IV.*—This was a child who had a supernumerary little finger, which did not articulate with the bones of the hand, but was connected to it merely by a slight pedicle.

Dr. Cory vaccinated this finger bud on the 14th of February from a tube taken on the 12th of February.

On the 18th of February, 97 hours after vaccination, the finger was removed by tying a silk ligature round its pedicle, and cutting it off beyond the ligature with a pair of scissors. There was no sign of any inflammation until the 21st, when there appeared on the hand a little redness surrounding the ligature. This increased to about  $\frac{3}{4}$  of an inch radius on the 22nd, and began to decline on the 23rd. The ligature came off on the last-mentioned day. There was no axillary enlargement or tenderness.

On the 2nd of April Dr. Cory vaccinated this child on the arm directly from another.

On the 9th of April all five places had taken, and the areola was then at its height and rather extensive.

On the tenth day the areola had declined. The scabs fell early, but the exact dates were not ascertained.

In considering these experiments there are two results which, according to Dr. Cory, appear striking. The first is, that in all the cases on the eighth day after the first vaccination an area of inflammation was present on the hand from which the vaccinated fingers had been removed. This was most remarkable in the fourth experiment, for in this case the finger was attached by a slender pedicle which was ligatured, and the extent to which the inflammation reached on the ninth day was greater than might have been expected merely from the irritation of the ligature. If this inflammation was not solely due to the irritation of the wounds, it must have been occasioned by the same conditions which lead to the development of the areola after ordinary vaccination. Dr. Cory does not, however, wish to lay much stress upon this point.

The second result is the most important, for it would appear from the three last cases that although protection against a second vaccination was not given by the first vesicles which were removed, yet these first vesicles did produce a certain effect which caused the second vaccinations to run rapid courses.

It is well known from Bryce's test that when a second vaccination is performed on the fifth day after the primary the vesicles which result run a rapid course, so that they overtake the primary vesicles, and both mature together. The same thing happens when the second vaccination is done later than the fifth day, as the following case proves:—

On the 2nd of March, 1876, Dr. Cory vaccinated a child, Edward Pillar, in four places on the right arm, from a tube taken on the 1st of March, 1876.

On the 8th of March, the seventh day afterwards, he vaccinated another place on the left arm, and he continued to vaccinate a place daily on this arm until the 14th of March.

The places vaccinated on the seventh, eighth, and ninth days after the primary vaccination took; the one, however, done on the last-mentioned day scarcely became vesicular, although it had on the 13th of March a slight areola round it. The places done on the tenth, eleventh, and twelfth days did not take, and no areola appeared around them.

On the 17th of March all the scabs on both arms were desiccated.

The whole course of the vaccination was thus seen not to have been prolonged by the later vaccinations, for the vesicles thereby formed rapidly developed and overtook the primary ones. The ninth day after the primary vaccination was in this case the latest day any result could be obtained by a fresh insertion of lymph, and this is precisely the result which Trousseau had observed in his experiments, mentioned on page 121, vol. i. of his work on Clinical Medicine, 3rd French edition.

As the vaccine vesicles usually increase in size up to the ninth day, but not afterwards, we see, Dr. Cory observed, that the last day we can vaccinate with effect is also the last day the vesicles increase in size; and this is what we might expect, for the vaccine vesicles will increase in size until the skin has undergone that unknown modification which renders it incapable of being further affected with the vaccine virus. When this has taken place the vesicles cannot spread.

Now suppose in one of the above experiments the child had been vaccinated in another portion of the skin on the same day that the finger was amputated, what would have been the result? Dr. Cory is inclined to think this second vaccination would have run a rapid course, just as we have seen it would have done if the primary vesicle had not been interfered with. In other words, the amputation of the finger would not have prolonged the time ordinarily occupied between the first insertion of the virus and the desiccation of the scabs.

From these considerations Dr. Cory thinks that it seems probable the modification, whatever it may be, which renders the system incapable of further infection with the vaccine virus, is a progressive one, commencing at the time or shortly after the first insertion of the virus, and goes on hand in hand with development of the vesicles. As he takes it, what the above experiments seem to show is, that this progressive modification is arrested when the vesicles are removed, and that when vaccination is again performed the modification already partially accomplished proceeds to completion from the point at which it had arrived when arrested.

Another matter here suggests itself for consideration, Dr. Cory

remarked, namely, the likeness which the rapidly-developing vesicles of the second vaccination in three of the above experiments presented to the vesicles in ordinary cases of secondary vaccination. The great characteristic of a secondary vaccination is, that it runs a rapid course and has an early areola. As a rule, the shorter the time that has elapsed between the primary and the secondary vaccination, the more rapid is the course, and the slighter the results of the latter.

A probable explanation of this likeness is found in this consideration. If the modification wrought in the system during the course of a primary vaccination be progressive—as we know the return from a state of perfect protection to the original condition is progressive—we should expect that a vaccination performed either when the modification had been arrested half-way, or when the modification had half passed off, would give rise to the same phenomena.

I think we have now seen reason for believing that if, in the course of a vaccination, the vesicles be removed before their full maturity, the protection afforded by the vaccination will only be partial, and that the time requisite for the system to re-acquire its original susceptibility to the virus will be shorter than if the vesicles had not been interfered with; and this leads us to the question, May not those conditions of the skin, such as eczema, which are known to influence the development of the vesicle, be also effective in arresting the modification of the system?

If this be so, we would then have an explanation for some of those cases in which small-pox has early followed vaccination, as well as a reason why, with slight scars, the protection against small-pox is not so great as when the scars are well-marked; for a slight scar may very well be taken to indicate that the vesicle which gave rise to it did not, from some cause or other, attain its full development.

## OBSERVATIONS ON RECENT NEWS AS TO CHOLERA.

BY SURGEON-GENERAL JOHN MURRAY, M.D.,

*President of the Epidemiological Society.*

I HAVE for many years devoted much time to the study of cholera, and continue to watch its progress with great interest. During the years 1875 and 1876, a severe epidemic raged all over India, which only culminated in the following year, 1877, causing a mortality of upwards of a million and a half (1,515,605). The disease subsided in the year 1878, but by recent accounts a fresh outbreak appears imminent. This is the period for the "Koom ke Melah," a great fair at Hurdwar, which takes place at an interval of twelve years, and is the occasion of a vast Hindoo pilgrimage to the sources of the Ganges, or rather to the place where that river enters the plains of India. In former ages the pilgrims had to ascend the mountains to the snowy birthplace of the sacred river, but now the degenerate people "boil their peas;" in other words, content themselves with visiting a more accessible locality.

The first record we have in India of a great outbreak of cholera is of one that occurred at one of these great fairs in 1785, when it is said that 80,000 people died on the spot, and that the disease was limited to an area of five or six miles, and did not spread over the country. The last three outbreaks, of which we have records at Hurdwar, differ from this, in so far as the cholera was disseminated over the country after the dispersion of the pilgrims. In 1855 there was very little disease during the fair, and in 1867 it only appeared the day before the fair broke up, but the disease then accompanied the returning pilgrims, was disseminated from them in all directions, proved fatal in the Upper Provinces and Punjab to 117,361 people, and ultimately extended to Europe.

In India during the years 1867-8-9, it proved fatal to upwards of one million of the inhabitants. During the present

fair cholera is reported to have made its appearance two or three days before the holy day for bathing, previous to dispersion, and the latest accounts indicate a very general and rapid dissemination of the disease over the country, facilitated, doubtless, by the rapid means of communication by railway. I shall anxiously watch its progress.

As this large crowd is evidently a source of danger, it has been proposed to interdict the assemblage. But the attendance at this ceremony is a religious duty, highly venerated by the Hindoos, with which it would be impolitic to interfere. Besides, the fair is a large commercial mart, where people of all countries meet, from China to Cabool, and from all parts of India, for purposes of trade, which would be seriously injured by its suppression. As the main source of the danger arises from the insanitary state of the ground on which the people are crowded together, it would be more practical and profitable to cure the sanitary defects than to interrupt the commerce which accompanies the religious assemblage of the people, particularly as the meeting always takes place at a season of the year in which cholera is generally quiescent in that part of the country, and the danger of an attack might therefore more readily be warded off.

During the epidemic of 1875-77 there were two remarkable natural phenomena—viz., famines in Bengal and Madras, and a cyclone wave in Bengal. It is interesting to note the coincidence of cholera mortality with these events. In Bengal during the famine of 1874, the mortality from cholera was 57,836, whilst in the previous year it was 72,475, and in the subsequent year it was 177,369. This would indicate that the want of rain, which caused the famine, was antagonistic to the prevalence of cholera.

During the famine in Madras and Bombay of 1875-6-7, the mortality from cholera was 728,432, whilst during the two previous years, 1873-4, there were only 1,259 deaths from cholera in the two Presidencies. There was a similar large mortality from cholera in Madras during the famines of 1833-4, and 1853-4.

The epidemic under notice has been most carefully watched and reported on by Drs. Townsend and Cornish, the Sanitary

Commissioners of the Central Provinces and of Madras, two of the most intelligent officers of the Indian service. The divergence of the disease from central points in each province, as also in that of Bombay, is clearly shown, and the supposed source indicated, and the channel of diffusion by human intercourse demonstrated. All these outbreaks started from points many hundreds of miles distant from Dr. Bryden's breeding ground in Bengal, and advanced towards it, as well as in opposite directions, in the same manner as I traced an attack in 1843-4-5, proceeding across the Punjaub from Cabool, and advancing from Lahore, Umballa, and Meerut, towards Bengal.

The cholera was fatal at a higher rate both in Bengal and Madras during the year following the famine than during the year of its greatest prevalence. In Madras the food pressure was greatest in July and August, 1876, but the cholera intensity was at its maximum in January and February, 1877. The increased mortality during this epidemic would indicate that great progress had not been made in the management and professional treatment of the disease, and the mere statistician would point to the figured returns as positive proof, whilst an antagonist to sanitary progress might even indicate these tables as proof that the sanitary rules that have been so steadily inculcated and carried out at so much expense had proved injurious, instead of beneficial, with reference to cholera. But this would be a partial and erroneous view. Sanitary defects furnish a rich soil for an abundant crop of cholera should the seeds be sown, and sanitary improvements cannot always avert that misfortune, but they mitigate the evil, and unless the seed be sown there will be no crop. The chief means of sowing this seed is by human intercourse and the crowding together of human beings. The practice of accumulating crowds of starving people in the famished districts materially contributed to the large development of the disease, and when the people returned to their homes they spread it over the country.

The knowledge of the danger of concentration has been turned to practical advantage in the removal of troops and prisoners into tents on the disease breaking out amongst them. This measure was introduced by the Indian Government in 1862, and the average mortality from that date to 1877—fifteen

years—has been only half what it was in the previous fifteen years.

Dr. Cunningham, in his Report for 1877, says, page 82:—  
“The removal of the affected from the locality has proved of signal service in the case of troops and prisoners, but this measure also, although founded on no theory of contagion, is one which, however much it may be recommended, can never be ordered by Government.”

The Sanitary Commissioner is oblivious in stating that removal was founded on no theory of contagion, in so far as in my report to the Special Commission assembled at Simla in 1868, of which his predecessor was a member, I stated—“It (removal) is founded on the principle that the disease (cholera) is communicable.” As I was the responsible medical authority on which the measure was instituted in 1862, I may be allowed to make this correction, more especially as I encountered much opposition in having this measure carried into effect. Dr. Cunningham rather approves of Dr. Bryden’s theory of the aerial wave of epidemic cholera being, by some unaccountable cause, localised in a station; but this same theory would prevent removal being beneficial unless it was to a place beyond the influence of the epidemic wave, which, in 1877, extended all over India.

I concur with Mr. Netten Radcliffe in considering it a mistake to reiterate, with regular recurrence, the same views in the same artificial language, whilst ignoring the practical opinions of the other Sanitary Commissioners whose views have not an aerial tendency. This is the more to be lamented as the mass of valuable statistical tables, which are most minutely and carefully compiled, form a mine of valuable facts which afford material aid in determining the true nature of the disease.

Mr. Radcliffe appears to be of opinion that little is known of the true nature of cholera, and that the best way to gain real information as to its etiology, would be to select a locality outside the endemic area where the disease is only occasionally present, and to appoint a scientific medical commission, who could study exhaustively the mode of beginning, continuance, and ending of cholera when it breaks out in the locality, as well

as the condition of diseases, especially diarrhoeal or choleraic, in the absence of cholera.

In my opinion much practical information is to be found in the Reports of the Sanitary Commissioners of the different Presidencies and Provinces. A proposal analogous to that of Mr. Radcliffe was submitted by the British Sanitary Commissioner to the Indian Government when I was in India. Any practicable scheme, well devised, with a view of the better observation of debated points as to cholera in India, and that gave promise of success, would doubtless be carried out even at considerable expense, as has been already proved. The hope of averting a mortality from cholera of 635,948, such as occurred in 1877, would assuredly justify further expenditure for this object.

### THE UNITED STATES' NATIONAL BOARD OF HEALTH.

ON the 3rd of March last an Act of Congress of the United States of America was approved, providing for the formation of a National Board of Health. This Act may reasonably be regarded as the most important general measure relating to the public health of the United States which has passed Congress. Hitherto such work of public hygiene as has been done in the United States has been mainly effected by the individual States, irrespective of each other. But the feeling has for some time been gaining strength among those most competent to form a judgment on the subject that public hygiene was not making such progress as should be looked for in the United States for the want of some co-ordinating agency, and this feeling appears to have been sharpened by the discussions which took place on the subject during the International Medical Congress held at Philadelphia in 1876, and especially by Dr. Bowditch's masterly centennial discourse on the state of public hygiene in America, given on that occasion.

The enactment of the 3rd of March, 1879, has been put in force with the energy characteristic of our Transatlantic brethren. The National Board of Health has been created; it has framed

bye-laws and rules for the regulation of its proceedings, and appointed various standing committees to consider the different subjects which require consideration from it—committees on rules and the interpretation of the constituting Act, on finance and accounts, on epidemics and contagious diseases, on adulteration and deterioration of food and drugs, on registration and vital statistics, on state and municipal and local sanitary legislation, and on diseases of domestic animals. Moreover, it has already issued a schedule of questions relating to the sanitary condition of a city or town, of which it may be said that the Board obviously entertains the most generous notions of its own capacity for work, and of the capacity for work of the local authorities of the almost innumerable cities and towns of the United States. The Board has published three circulars for the information of the public, all bearing date April 7th, 1879. Circular No. 1 gives the constituting Act, describes the organisation of the Board, and makes public the bye-laws and rules which will govern its operations; No. 2 contains the schedule of questions relating to the sanitary condition of a city or town, to which we have referred; and No. 3 gives an explanation of the constitution and functions of the Board. As already some misapprehensions on this subject have appeared in the English press, and it is of much interest that the position of this new and important development of public hygiene in the United States should be accurately understood, we reproduce the authoritative statement of No. 3.

*National Board of Health, Washington, D.C.—Circular No. 3,  
April 7th, 1879.*

“The National Board of Health desires, through the medium of this circular letter, to give information of its organisation, of the objects which it is designed to accomplish, and of its proposed methods of performing its prescribed duties. The act establishing this Board passed Congress March 4th, 1879,<sup>1</sup> and is as follows:—

“*AN ACT to prevent the introduction of infectious or contagious diseases into the United States, and to establish a National Board of Health.*

“There shall be established a National Board of Health, to consist of seven members, to be appointed by the President, by and with the advice and consent

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[<sup>1</sup> In the Copy of the Act before us, and in Circular No. 1, the Act is marked “Approved, March 3, 1879.”—ED. P.]

of the Senate, not more than one of whom shall be appointed from any one State, whose compensation, during the time when actually engaged in the performance of their duties under this Act, shall be ten dollars per diem each, and reasonable expenses, and of one medical officer of the Army, one medical officer of the Navy, one medical officer of the Marine Hospital Service, and one officer from the Department of Justice, to be detailed by the Secretaries of the several Departments, and the Attorney-General, respectively, and the officers so detailed shall receive no compensation. Said Board shall meet in Washington within thirty days after the passage of this Act, and in Washington or elsewhere from time to time upon notice from the president of the Board, who is to be chosen by the members thereof, or upon its own adjournments, and shall frame all rules and regulations authorized or required by this Act, and shall make or cause to be made such special examinations and investigations at any place or places within the United States, or at foreign ports, as they may deem best, to aid in the execution of this Act, and the promotion of its objects.

"The duties of the National Board of Health shall be to obtain information upon all matters affecting the public health, to advise the several Departments of the Government, the executives of the several States, and the Commissioners of the District of Columbia, on all questions submitted by them, or whenever, in the opinion of the Board, such advice may tend to the preservation and improvement of the public health.

"The Board of Health, with the assistance of the Academy of Sciences, which is hereby requested and directed to co-operate with them for that purpose, shall report to Congress at its next session a full statement of its transactions, together with a plan for a national public health organisation, which plan shall be prepared after consultation with the principal sanitary organisations and the sanitarians of the several States of the United States, special attention being given to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State or local systems of quarantine and a national quarantine system."

"The membership of the Board of Health, constituted under this Act is as follows :—Dr. Preston H. Bailhache, U.S. Marine Hospital Service ; Dr. Samuel M. Bemiss, of Louisiana ; Dr. Henry I. Bowditch, of Massachusetts ; Dr. John S. Billings, United States Army ; Dr. James L. Cabell, of Virginia ; Dr. Hosmer A. Johnson, of Illinois ; Dr. Robert W. Mitchell, of Tennessee ; Samuel F. Phillips, Solicitor-General ; Dr. Stephen Smith, of New York ; Dr. Thomas J. Turner, United States Navy ; Dr. Tullio S. Verdi, of the district of Columbia.

"The Board held its first meeting on the 2nd of April, and organised by the election of the following officers :—President, Dr. James M. Cabell ; Vice-president, Dr. John S. Billings ; Secretary, Dr. Thomas J. Turner ; with Dr. Stephen Smith and P. H. Bailhache as Executive Committee.

"It will be perceived that, by the Act establishing a National Board of Health, the functions of that body are in no sense executive, but chiefly co-operative and advisory.

"The special duties indicated are threefold, viz. : 1. The institution of special examinations and investigations, and the collection of information upon all matters affecting the public health. 2. Advising the several departments of the Government, the Executives of the several States, and the Commissioners of the District of Columbia, on all questions referred to it. 3. Submitting to Congress a plan for a National Public Health Organisation.

"In the performance of the first class of duties the National Board feels well

assured that its utility depends mainly upon its securing the confidence and cordial co-operation of State and local sanitary authorities, and of the leading physicians, sanitarians, and scientific men of the United States. Such confidence and co-operation it will seek to obtain by advising and aiding in the most fraternal spirit such authorities, and by employing skilled persons in the investigations which it may undertake. We deem it the duty of this Board to act as the agent through which the United States Government shall furnish the necessary stimulus and means to enable skilled sanitarians and properly constituted sanitary authorities and organisations to prosecute and perfect scientific inquiries necessary to the protection and preservation of the public health. Acting in this capacity, the Board must necessarily exercise its discretion as to the kind of work most important, and by whom and where it shall be performed to secure the best results. In general, such work must be performed by local agencies, and it will be the highest privilege, as well as the most serious responsibility of this Board, to select throughout the United States the men best qualified for such special duties, to stimulate and sustain them in their efforts, and finally to give proper publicity to their studies.

"In the discharge of the second or advisory functions required, this Board must often seek the co-operation of State and Municipal authorities, especially when questions are submitted by the Executives of States. In such cases the National Board desire, to the fullest extent of its means, to aid local authorities in making needful investigations, and to co-operate, as far as it shall have power, in giving force and effect to the advice submitted.

"In preparing a plan for a national public health organisation to be submitted to the next Congress, this Board is especially required to obtain the co-operation of the Academy of Sciences, and consult the principal sanitary organisations and the sanitarians of the several States of the United States. In order to the proper performance of this duty, perhaps the most important which will devolve upon it, this Board earnestly asks the counsel and co-operation of all persons who are interested in establishing permanent sanitary administration in connection with the general Government. The time was never so auspicious as the present for laying broad and deep the foundations of a public health service at the seat of Government.

"Public sentiment is now not only ripe but urgent for such a reform, while Congress is prepared to adopt and give effect to a measure for perfecting such an organisation. Aided by the enlightened counsels of the scientific bodies and sanitarians to whom it is permitted to appeal, the National Board of Health will avail itself of every means in its power to perfect a plan of a public health organisation worthy of a country whose soil and climate require only the incorporation of adequate sanitary into civil administration—National, State, and Municipal—to make it the home of the healthiest and happiest people of the world."

## DENSITY OR PROXIMITY OF POPULATION; ITS ADVANTAGES AND DISADVANTAGES.

BY WILLIAM FARR, M.D., F.R.S., D.C.L., ETC.

(*From the 40th Annual Report of the Registrar-General for Births, Deaths,  
and Marriages.*)

DR. CHERVIN, in a periodical of great merit,<sup>1</sup> points out the fact that Carey Schaeffle and Herbert Spencer have not succeeded in applying statistics to their theory of sociology. In our social science we were more fortunate. It is true that in many branches of social science we have to forego the use of analysis: but to others analysis has been successfully applied. I propose to illustrate one of these applications.

The population is distributed over the face of the earth in town and country; and I will consider here some of the advantages and disadvantages of the two kinds of distribution. To do this we must, for mathematical purposes, use terms more precise than town and country: and density—usually of population—has been the term employed. For instance, the density of population in England (1861-70) was 367 persons to a square mile. This implies that England is divided into 58,311 square miles; and that on each square mile there are 367 persons. The density of population on every square mile is different, but taken in the aggregate this is the mean density.

We can conceive the mean population of England in 1861-71 (21,389,245) distributed over 37,819,221 acres, or one person to every 1.74 acres. Thus imagine the population distributed in the centre of circles—or rather hexagons—of the area of 1.74 acres; then every person must be a certain number of yards from his neighbour: this distance I propose to call the proximity. The proximity of the people of England—their nearness to each other—is now (in 1876) 93 yards.

The advantage of residence in towns—of proximity of people to each other—is evident. Man is a sociable animal; and naturally in his workshop meets his fellow-man. It is, perhaps, impossible to enumerate all the ways in which men derive pleasure or benefits from frequent intercourse with each other; but it is possible to determine the sum of their gratifications by an economical test. What do they give per acre for the ground on which they live in country and town? You will find as from the country you approach the centre of the town the value of the land increases; thus it is 25%, 50%, 100%, 200%, 400%, 800%, 1,600% per acre. Now, on what score are these additional sums demanded or given? Is it not that men derive advantages from living near to each other?

There are countervailing disadvantages to which I shall now invite your attention. The first disadvantage strikes every one that comes from the country; and is embodied in Cowper's line—

“God made the country, and man made the town.”

In the country you are surrounded by fields, by trees—in hill or vale; there the breezes coming from sea, shore, or mountain have free play. The atmosphere is redolent of ozone. In the town this is wanting. Angus Smith, by chemical tests,

<sup>1</sup> *Annales de Démographie Internationale*, No. 5 Article.—*Sociologie et Statistique*, pp. 75-96.

proves the air is different. You know that nitrogen and oxygen are everywhere nearly the same in proportion; but carbonic acid varies with the density of population, and there are exhalations—smokes—of various kinds from dead matter, as well as from living bodies. Every town has an atmosphere of its own. Nay, every street has its own peculiar atmosphere. I was going to say that every living being has its own atmosphere.

Now, this atmosphere becomes in certain proportions deleterious, and I will proceed to show that as the population becomes more dense—within certain limits—this deleteriousness is expressed by the mortality. For example, if we arrange the 619 districts of England and Wales in groups according to the rates of mortality, we find that the 18 groups follow this law; the rate of mortality increases as the density of population increases.<sup>1</sup> Thus at one end of the scale the deaths per 1,000 of population are 15, 16, 17; at the other end of the scale, 31, 33, and 39; the acres to a person in the corresponding districts are 12, 4, and 3; and .01, .05, and .01. The intermediate rates of mortality are 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, and 29; the acres to a person are 4.0, 3.3, 2.9, 2.1, 1.1, 1.0, 0.5, 0.2 and .02.

Now, excluding the London districts, about which there is some difficulty, we have seven groups of districts where the mortality ranges thus: 17, 19, 22, 25, 28, 32, and 39. In the same districts the numbers of persons to a square mile are—166, 186, 379, 1,718, 4,499, 12,357, and 65,823. Thus, in Liverpool, the densest and the unhealthiest district in England, there were 65,823 persons to a square mile; of whom, 39 per 1,000 died annually. This series of facts may be put in a different way: the nearer people live to each other the shorter their lives are. Thus, the proximity of people in 53 districts is 147 yards, the mean duration of life is 51 years; in 345 districts the proximity is 139 yards, and the mean duration of life is 45 years; in 137 districts the proximity is 97 yards, and the mean duration of life is 40 years; in 47 districts the proximity is 46 yards, and the mean duration of life is 35 years; in 9 districts the proximity is 28 yards, and the mean duration of life is 32 years; in Manchester District the proximity is 17 yards, and the mean duration of life is 29 years; in Liverpool district the proximity is 7 yards, and the mean duration of life is 26 years.<sup>2</sup>

This is a determined law; and the duration of life being given in one set of conditions, the duration of life in another set of conditions is determined from the proximities.

$$c' = c \left( \frac{P}{P'} \right)^{.23996}; \quad 35 = 45 \left( \frac{46}{139} \right)^{.24}$$

applied to the districts where the mean lifetime is 45 and the proximity 139 yards enables us to determine the lifetime where the proximity is 46 yards.

We will now draw some inferences from this law: that proximity and shortness of life go together.

<sup>1</sup> The mortality and the density are for the ten years 1861-1870. See Supplement to Registrar-General's 35th Report, p. cli. to clxii.

<sup>2</sup> It has been found that the mean duration of life of a people (by the English and other Life Tables) is nearly equivalent to the reciprocal of the death-rate *minus* one-third of the difference between the reciprocal of the death-rate and that of the birth-rate; and the above values were determined in this way. Thus the birth-rate in the group of 53 districts was .03022 and the death-rate .01675; so

$$\frac{1}{.01675} - \frac{1}{3} \left( \frac{1}{.01675} - \frac{1}{.03022} \right) = 59.7 - \frac{1}{3} (59.7 - 33.0) = 51.$$

(1.) The question is of the highest importance to England. Every town is surrounded by circles of new houses; and at every census villages are found grown into new towns. Thus, in the last three censuses, the town population was set down at 8,990,809, 10,960,998, and 14,041,404; and to England and Wales 2,000,000 of people have probably been added since the census of 1871, the greater part of whom will be found in the towns.

Now, according to our law, this should imply an increase of mortality; and no doubt such an increase would have been observed had there not been a counter-vailing law in operation.

(2.) The mortality was at the annual rate per 1,000 in the last three decennials of 22·36 in 1841-50, 22·24 in 1851-60, and 22·51 in 1861-70. In the last seven years, 1871-7, the mortality was at the rate of 21·64, or ·87 per 1,000 less than in the ten years last quoted. Thus we may hope that there is a reduced mortality in the last seven years; and that thus about 20,000 lives are saved annually.

(3.) While the population has increased, the atmosphere has become purer; and this should encourage us to persevere in our efforts in the same direction.

(4.) The law of proximity would lead us to lay down some standard, and to fix some invariable rule, that beyond a certain density, no further houses should be built on the town areas. Thus, in 28 towns of the United Kingdom there are 38 persons to an acre; and if such was the standard where would Liverpool be with its 102 persons to an acre; where would Glasgow be with its 94 persons; Manchester with its 84 persons; Edinburgh and Plymouth with their 53 persons to an acre?

(5.) It is certain that the most effective means of reducing the mortality is to thin the dwellings in the dense parts of the towns; to abolish under Mr. Cross's Act all the rookeries, and not to rebuild them.

(6.) Simultaneously to put a stop to much of the smoke, and to the sewage gases which are poured into the air the population breathes.

(7.) The law might enact for the future that squares and parks should be left in the area of every town; as these spaces are indispensably required for the health of the population.

(8.) And for the present time the whole of the available land should not be built over, but spaces be appropriated for parks wherever they can be procured. Miss Vernon's paper in the Transactions of the Social Science Association will throw much interesting light upon this subject.

TABLE A.—PROXIMITY OF POPULATION.

*Five hundred and ninety-three districts of England and Wales are arranged in seven groups in the order of mortality. The districts of London are excluded.*

TOWN, OR DISTRICT.	Proximity of the Population (in yards).	Number of living out of which one will die annually.	Mean duration of Life.
Liverpool . . .	7	26	26
Manchester . . .	17	31	29
9 Districts . . .	28	36	32
47 Districts . . .	46	40	35
137 Districts . . .	97	46	40
345 Districts . . .	139	53	45
53 Districts . . .	147	60	51

TABLE B.—STATES OF EUROPE, 1876.

COUNTRY.	Proximity of the People.		Density of the Population. Persons to a square kilometre.
	Metres.	Yards.	
England and Wales . . . .	84·81	92·75	160·535
Denmark . . . . .	152·45	166·72	49·683
Sweden . . . . .	339·51	371·30	10·017
Austria . . . . .	126·78	138·65	71·839
Hungary (1875) . . . . .	154·72	169·21	48·240
Prussia . . . . .	124·30	135·94	74·738
German Empire . . . . .	120·29	131·55	79·793
Belgium . . . . .	79·84	87·32	181·163
Netherlands . . . . .	99·25	108·54	117·236
France . . . . .	128·76	140·82	69·652
Spain (1870) . . . . .	186·06	203·48	38·357
Italy . . . . .	111·00	121·39	93·714

The Populations used for the above Table are taken from the Registrar-General's 39th Report. With the exception of Hungary and Spain they are for the year 1876 (estimated or enumerated).

The areas were obtained from the Almanach de Gotha.

TABLE C.—FOREIGN TOWNS.

Town	Date at which the Population is taken.	Proximity of the People in metres.	TOWN.	Date at which the Population is taken.	Proximity of the People in metres.
Bombay . . . . .	1872	9·29	Breslau . . . . .	Jan. 1878	11·43
Madras . . . . .	—	14·25	Munich . . . . .	"	16·38
Paris . . . . .	1876	6·78	Vienna . . . . .	"	9·37
Brussels . . . . .	Jan. 1878	7·70	Buda-Pesth . . . . .	"	25·93
Amsterdam . . . . .	Feb. 1878	7·40	Rome . . . . .	"	7·60
Rotterdam . . . . .	"	7·63	Naples . . . . .	"	11·56
The Hague . . . . .	"	15·42	Turin . . . . .	"	9·50
Copenhagen . . . . .	Jan. 1878	8·32	Alexandria . . . . .	—	17·44
Berlin . . . . .	"	8·19	New York . . . . .	1878	10·64
Hamburg (State) . . . . .	Feb. 1878	33·08	Philadelphia . . . . .	"	21·02

Calcutta, Geneva, Stockholm, Christiania, Dresden, Venice, Brooklyn, and Boston are not included in the above Table, the area not being known. The area of Alexandria is given in a letter as 5,586 square kilometres, which is clearly wrong; 55·86 square kilometres has been used in the calculation.

TABLE D.—ENGLAND AND WALES, AND TOWNS OF GREAT BRITAIN AND IRELAND, 1878.

NAME.	Proximity of the People in metres.	NAME.	Proximity of the People in metres.
England and Wales . . .	83·76	Nottingham . . .	16·78
England and Wales . . .	90·44	Liverpool . . .	6·76
(excluding London) }		Manchester . . .	7·46
{ Greater London . . .	21·65	Salford . . .	11·91
{ Inner London . . .	9·92	Oldham . . .	14·25
{ Outer Ring . . .	44·41	Bradford . . .	13·50
Brighton . . .	10·29	Leeds . . .	18·18
Portsmouth . . .	12·72	Sheffield . . .	17·81
Norwich . . .	20·31	Hull . . .	10·90
Plymouth . . .	9·42	Sunderland . . .	10·72
Bristol . . .	10·04	Newcastle-on-Tyne . . .	13·17
Wolverhampton . . .	14·62	Edinburgh . . .	9·39
Birmingham . . .	10·12	Glasgow . . .	7·05
Leicester . . .	11·09	Dublin . . .	12·21

# THE PRACTITIONER.

AUGUST, 1879.

## Original Communications.

### THE USE OF IRON IN CERTAIN STAGES OF CARDIAC DISEASE, AND THE ADVANTAGE OF COMBINING CHLORIDE OF AMMONIUM WITH IRON.

BY T. GRAINGER STEWART, M.D., F.R.C.P.E.,

*Professor of the Practice of Physic in the University of Edinburgh.*

In this communication I wish to draw attention to two points. First, that in certain cardiac cases, particularly those in which the aortic valves are diseased, a peculiar condition sometimes arises which demands for its treatment large doses of iron. Second, that in some cases, both belonging to the above group and of other kinds, the reception of iron by the system is greatly facilitated if chloride of ammonium be administered along with it. •

In illustration of both points I shall cite the following case:—

Neil McLeod, a seaman, 33 years of age, was admitted to the Royal Infirmary on the 23rd October, 1877, complaining of breathlessness on exertion, giddiness, palpitation and pain in the region of the heart. In 1867 he had suffered from rheumatic

fever, but was not aware that any cardiac complication had then existed. In 1875 he observed that his strength was failing, that he had become breathless on exertion, was apt to cough, and often had passing fits of giddiness. These symptoms rapidly increased, and he soon felt himself unfit for duty.

At different times he was under treatment in the infirmary at Calcutta, and in Greenwich Hospital, and although he made each time a temporary rally, he soon fell back, and on the whole the debility, breathlessness, and pain, were gradually increasing.

The exacerbation of illness which led him to seek admission to the infirmary, had been induced partly by hard work while employed in a coasting vessel scarcely sea-worthy, and partly by intemperance.

On admission his face was pale, his expression anxious, his eyes were somewhat staring, his lips slightly livid. His temperature was normal, and beyond flabbiness of tongue, and some feebleness of digestion, there was no disease of the alimentary system. The liver dulness was increased, measuring seven inches in the mammillary line, and the organ was tender on pressure. There was some bulging in the præcordial region. The apex beat of the heart was felt strong and diffused, the area of dulness of the heart was increased. On auscultation in the mitral area, a loud, harsh, systolic bruit was heard, propagated towards the axilla and inferior angle of the scapula. There was also a slight diastolic murmur. In the tricuspid area there was a short systolic murmur, and a prolonged diastolic. In the aortic area the first sound was weak and impure, there was also a loud high-pitched diastolic murmur propagated down the sternum to the ensiform cartilage. In the pulmonary area the second sound was accentuated. The pulse was forty-six per minute, weak and compressible, and even in this condition presented something of the water-hammer character, although much less distinctly than it did at a later period in the history of the case. There was no dropsy, and the urine was natural.

There could be little doubt that the valvular lesions had originated in connection with the rheumatic fever, and it was clear that these lesions were incompetence of the aortic and mitral valves, with impairment of the muscular power of the

heart. All the other symptoms, the general poverty of blood, the cerebral anæmia, giddiness and general distress, were secondary to these. The indications for treatment were to obtain rest, to support the strength, and in particular to strengthen the heart and improve the condition of the blood. If these indications could be met, it seemed likely that the symptoms due to anæmia and deficient nutrition of the brain would disappear, and that on their disappearance the patient would be comparatively well. With the view of meeting the first indication, the patient was directed to remain in bed; the second, food rich in nitrogen, and in quantities small at a time but frequently repeated, was ordered; and the third, perchloride of iron in full doses was prescribed. At first twenty minims of the tincture were given three times a day, but the doses were gradually given more frequently until he was taking five or six in the twenty-four hours. It was at once apparent that these measures were doing good. The pallor became less marked, the giddiness and headache less troublesome. But some functional derangement of the stomach and liver set in, the tongue became furred, the appetite impaired, the liver somewhat more enlarged from increased congestion, and the headache became again more severe; the patient's condition thus continued to be manifestly perilous. In these circumstances, instead of abandoning perchloride of iron, I added to it chloride of ammonium in doses of half a grain to each minim of the tincture. This was followed by the best results, for the gastric and hepatic symptoms rapidly disappeared, and for a considerable time the patient went on taking the mixture six times a day, so that he used two drachms of the tincture of perchloride of iron daily, without exhibiting the slightest sign of gastric or hepatic disturbance.

As a result of this treatment, to quote the words of Mr. Henry Handford, M.B., the clinical clerk, "a gradual but marked improvement in his general condition took place. His face lost its anxious expression, the palpitations became less distressing, the action of the heart less tumultuous, although still not quite regular. The pulse became much stronger and more frequent—seventy in the minute—and more characteristic of aortic regurgitation. The aortic diastolic murmur became less loud, but

nevertheless was quite distinct. The mitral symptoms remained unaltered. The congestion of the liver was not so great, as shown by a decrease in the vertical dulness. The transverse dulness of the heart was unaltered." It may be added that the pallor and the signs of cerebral anæmia became less marked, and the patient left the infirmary in a condition which enabled him to resume his occupation.

This case afforded an example of a condition by no means uncommon, but of which I have been unable to find a satisfactory description in books. The first glance at the patient leads one to notice the pallor, the very anxious expression, the restlessness, the pale lividity of the lips, the throbbing of the carotids, and perhaps of the temporal arteries; whilst the patient complains of giddiness, perhaps of headache, certainly of breathlessness, and of a debility that amounts at times to faintness. He is somewhat relieved by food, and unless there is some dropsical effusion to prevent it, he is easier in the recumbent position. But he obtains very little sleep. The explanation of his various symptoms is readily found. The pallor and the head symptoms are due in part to anæmic deterioration of the blood and partly to imperfect filling of the arteries supplying the face and brain. The throbbing is due to the ill-filled condition of the arteries, contrasting with their sudden temporary filling during the ventricular systole; while the breathlessness and the lividity are connected with the dilatation and the partial failure of the heart's action. Sometimes the distress is aggravated by the existence of dropsical effusion, and it seems to be specially severe when the pericardium is its seat. Such cases sometimes prove rapidly fatal by sudden syncope, and sometimes death follows upon a long agony, characterised mainly by symptoms of cerebral anæmia. These cases do not seem ever to recover spontaneously.

Treatment by the administration of cardiac tonics, and especially of iron, leads in many cases to decided improvement. The form which I find best is the tincture of perchloride, but it must be given in large quantity. I have gradually been led to give it in larger doses; sometimes even to the amount of twenty minims every two hours, more frequently every four hours, continuing its use for days together. In many cases

the patients speedily experience relief, and before long there is manifest improvement. As in the patient whose history I have given, they are enabled after a time to leave the hospital and return to work.

But there is great difficulty in carrying out this plan of treatment from the gastric and hepatic derangement which so frequently follows upon the use of iron. During the past two years I have sought to meet this difficulty by combining chloride of ammonium with the iron, according to the suggestion of a medical officer of the Indian service, to the members of which we are so much indebted for our knowledge of the value of that salt in hepatic affections. During that time I have repeatedly been thus enabled to administer iron in large doses in combination with chloride, to patients who otherwise could scarcely have used iron. It will be observed that in the case now recorded, the iron speedily led to dyspeptic symptoms, so that it was impossible to persevere with its use. But the addition of the chloride both relieved the existing dyspepsia and enabled us to continue to administer the iron in large doses, and for a considerable time. So far as I can judge, iron is the only remedy which could have saved the life of the patient at the time, and but for this effect of the chloride of ammonium, I do not know how I could have administered iron so freely as to suffice.

But the combination of perchloride of iron and chloride of ammonium is useful not in cardiac cases only. I shall not narrate cases of my own in illustration of this, but shall bring forward two, of which notes have been given me by my friend, Dr. James Ritchie.

A lady, aged 62, suffering from carcinoma uteri, had frequent attacks of metrorrhagia which had produced profound anæmia. The tincture of perchloride of iron was prescribed, but it produced so much gastric irritation that it had to be discontinued. After the stomach had recovered she was again ordered tincture of perchloride, with the addition of ten grains of the chloride of ammonium, to every twenty minims of the tincture. This mixture was well received by the stomach, and was continued for some weeks without the slightest disturbance of digestion.

Again, a boy of 13, of feeble and rather strumous constitution, suffered from sore throat, gastro-intestinal disturbance, headache, giddiness, and almost daily epistaxis. The liver was enlarged so as to extend down nearly to the umbilicus, was tender, and had an uneven surface. The spleen also was enlarged, and projected three inches beyond the costal cartilages. Microscopic examination of the blood showed marked increase of the white corpuscles, with great diminution of the red, and an unusual amount of granular material. In this case it seemed highly probable that the iron alone could not be received, and accordingly the combination of iron and chloride was administered. The medicines were well borne, and speedy improvement of the general condition took place.

## ACONITE IN PNEUMONIA.

BY A. C. F. RABAGLIATI, M.A., M.D.,

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THE cases of pneumonia cut short by the use of tincture of aconite which Dr. Dobie has lately recorded in the *Practitioner* appear to me deserving of some remarks, which I shall attempt to keep within as short a compass as possible. I have no doubt all the cases were really pneumonias, and the treatment is such as is not only recommended in some text-books of therapeutics, but I should say is in pretty general use among medical men, though not yet perhaps so much so as it ought to be. It has been my practice for years to treat incipient pneumonias and also other simple inflammations by aconite, which however I have found it convenient to use of  $\frac{1}{10}$ th of the strength of the pharmacopoeial tincture, the remaining  $\frac{9}{10}$ ths being rectified spirit. I think if Dr. Dobie had used this preparation he would not have induced the vomiting which he describes in Cases III. and IV., and which is no essential part of the cure.

I should like to say a few words on the *rationale* of the use of aconite, and shall do so in language similar to what I used in addressing to your readers some remarks on the question, "Are there Laws of Therapeutics?" In my view aconite follows the universal law of agents (not merely therapeutical remedies) competent to affect the economy, viz., that it acts by *action* and *reaction*, which are contrary to one another. The action of aconite is the same as that of cold: it depresses the vital power of the sympathetic nerves, and contracts the vaso-motor muscular fibres. The reaction of aconite (or, properly

speaking, of the economy affected by aconite) is shown in relaxation of the spasm, and in congestion of the capillary vessels. If one attends only to this latter occurrence, one may say, aconite causes the phenomena of the (simple) feverish state. In point of fact, however, this is only half the truth, which is, stated fully, this: aconite causes first spanæmia, and second, congestion of the capillary vessels. Now what is (simple) inflammation? Is it not the reaction due to exposing the body to cold? And are not the steps of the process first spanæmia of the exposed part, and second congestion of the same? The latter condition we are in the habit of calling inflammation, though only by overlooking the fact that it is a secondary, and not a primary occurrence—an error, by the way, that Cullen did not fall into. Aconite, then, cures inflammation because its action depresses the vaso-motor system, and therefore lowers the excitement of the febrile reaction. For which reason the dose should be small, so small as not to induce any secondary wave of reaction, which might leave the patient as bad as he was before. Being small, the dose should be frequently repeated; and I am in the habit of administering it, not every hour or half-hour, but every ten or fifteen minutes, till lowering of pulse and temperature, moisture of skin, and sleep, are induced. Not once, but many times, have I been able thus to check incipient pneumonia, peritonitis, pleurisy, and tonsillitis; and in children particularly the effects are marvellous. The induction of sleep is difficult to explain. I do not think it is a direct effect of aconite, but rather an indirect one, obtained by combating the excitement, and *allowing* rather than *inducing* nature to complete the cure by rest. Sweating seems also to be an indirect effect of the administration, to be explained in some similar way.

Next comes the question, Why does aconite act in pneumonia on the capillaries of the lung, in pleurisy of the pleura, in tonsillitis of the tonsil, &c.? Because, it is replied, these parts when inflamed are more susceptible than when they are in their normal state, just as they are more susceptible to painful pressure. Aconite has a wide range of action, but is determined to act on a given part of the capillary system by the susceptibility of that part.

Now, to show further that this view of action and reaction is sound, let me remind you that the *reaction* caused by cold can be itself cured by the *action* of cold. Judicious "packing" will resolve a pneumonia about as well as aconite. Again: excessive pressure will cause inflammation of the skin as its reactionary effect, and I have, on one occasion, which I shall always remember, cured the inflammatory erysipelas which followed excision of the knee-joint in a young woman by a carefully-applied bandage. The water used for packing in the former case should not be too cold, neither should the bandage in the latter be too tightly applied; otherwise reaction might in turn be set up and the inflammatory symptoms increased. Supposing the erysipelas in the case just referred to to have been due to over-pressure, these instances of treatment are not covered by the formula *similia similibus*, but must be stated as *eadem iisdem, ταὐτὰ τοῖς αὐτοῖς*, or *identical by identical*. Even then, however, the formula would be but an empirical one, which is explained when action and reaction, its simpler expression, are considered and understood. Neither is it true to say, as some do, "a moderate dose acts as you describe, but a large one has only what you call the secondary action." For, first, what is a large dose, and what a small, and what a moderate one? And second, when the dose is big enough, only the primary action is induced, since the patient does not live to have the secondary; just as a man exposed all night in the snow has neither inflammation nor frost-bite, since he is killed before he has time to have either. Supposing one were to argue from that, that cold has an opposite action in small quantities to what it exerts in large quantities! Thirdly, just as the mass of medical men to-day think of inflammation as a congestion simply overlooking the spanæmia which precedes that condition (and how many of us have given due attention to the \*subnormal pulse and temperature which succeed the congestion?), so, I am convinced, have many others overlooked the depression induced by aconite previously to the induction of the feverish state, and hence have said, "Aconite induces the feverish state." There is reason for thinking that the reaction of a remedy or agent is proportional to the action of the same; but I will not weary your readers by repeating at

length what has been said on a former occasion. Meantime I think I have shown that—

1. Aconite, like other agents, has on the economy an action and a reaction. The former is a spanæmic, the latter a congestive action.

2. Small and large doses have only an apparent, not a real contrariety of action.

3. Aconite acts in simple inflammations by combating the reaction of cold, which is commonly, but only by oversight, called inflammation.

## ON THE TREATMENT OF THE NIGHT-SWEATING OF PHTHISIS.

BY WILLIAM MURRELL, M.D., M.R.C.P.,

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CONSIDERABLE attention has recently been attracted to the subject of sweating by the researches of Marmié, Adamkiewicz, Nawrocki, Luchsinger, Vulpian, and Ott. An admirable *resumé* of the present state of our knowledge will be found in the *Lancet* for May 3rd and June 14th of the present year. In this paper an endeavour will be made to consider what means are at our disposal for checking abnormal sweating, attention being particularly directed to the treatment of the night-sweats of phthisis.

Sweating occurs in phthisis from two causes—weakness and fall of temperature. When the sweating is due to weakness, it may occur at any time—day or night—and is excited by apparently trivial causes. The sweating from fever usually occurs at about three or four in the morning, when the temperature is lowest. These two varieties of sweating may, and often do, co-exist. The greater the weakness of the patient and the greater the diurnal range of temperature, the more profuse the sweating. By checking the sweating the strength of the patient is economised, by preventing, as Dr. Fothergill suggests, the loss of the large quantities of salts which escape with the sweat.

### I.—OXIDE OF ZINC.

Probably no remedy has been more extensively employed in the treatment of the night-sweating of phthisis than oxide of zinc. The estimation in which it is held will be gathered from the

following extract from a well-known work on consumption<sup>1</sup>:—  
 “The medicine we have found to act almost as a specific on night-sweats is the oxide of zinc in doses of two or three grains in the form of pill at night. This we have given ourselves and seen others give to thousands of patients, and the good results have generally been so prompt and lasting that in few cases has it been necessary to continue it for any lengthened period.”

Oxide of zinc has been so long in use that the origin of the treatment is almost lost in obscurity. It appears that as far back as 1837 Dr. Busse of Berlin recorded the case of a gentleman who, after taking a scruple of the oxide daily for some months for epilepsy, became cold and shrivelled and his skin like parchment, but this observation attracted but little attention. Some years later the property of drying the skin was noticed by the late Dr. Robert Dickson of the Hospital for Consumption at Brompton, in some patients to whom he administered it as a general tonic and for diarrhoea, and this led him to give it with the view of checking nocturnal perspirations. Mr. Vertue Edwards, the well-known resident medical officer at the Brompton Hospital, gave the new remedy an extensive trial in some patients under the care of Dr. John Hutchinson—of spirometer fame—who had temporary charge of the wards. The treatment was then adopted by the late Dr. Theophilus Thompson, who, in a lecture delivered in the spring of 1851, says:—“No remedy which I have as yet employed has exercised so uniformly favourable an effect in moderating the perspirations,” but he adds, “the preparations of zinc occasionally fail to accomplish the object, and in some instances, after succeeding for a time, lose their power.”<sup>2</sup> Many papers have since been published confirming these facts, but they have thrown no additional light on the subject.

The oxide of zinc is usually given at bed-time in from five to ten-grain doses made up into pill, with extract of hellebore or conium. The hyoscyamus is said to prevent sickness, and probably exercises an influence allied to that of its more powerful

<sup>1</sup> *Pulmonary Consumption*. By C. J. B. Williams, M.D., F.R.S., and C. T. Williams, M.A.

<sup>2</sup> *Clinical Lectures on Pulmonary Consumption*. By Theophilus Thompson, M.D., F.R.S., and E. Symonds Thompson, M.D., F.R.C.P.

congener, belladonna. The oxide is sometimes given in powder, but in this form is not unlikely to upset the stomach. It must be admitted that even in large doses it not unfrequently fails; some writers say in nearly a third of the cases. I have used it very frequently, but have no notes available for statistical purposes. It is said to check other forms of pathological sweating, as in intermittent fever and acute rheumatism, for example. Sulphate of zinc in two-grain doses will often check the sweating of phthisis, but it has no advantage over the oxide, and is seldom used for this purpose. How the zinc salts act in these cases is not well understood, and our knowledge may be summed up in the vague statement that they are "astringents."

## II.—ATROPIA.

Dr. Milner Fothergill in an interesting article recently published in the *Practitioner*,<sup>1</sup> says:—"The most potent of all anhidrotics in my experience is unquestionably belladonna. We are indebted to Dr. Sydney Ringer for our knowledge of this property of belladonna; and the debt we owe to him can only be sufficiently estimated by those who have an extensive experience of phthisis, and who give the drug a fair trial. I have no hesitation in saying that the use of this agent completely changes the aspect of many cases of pulmonary phthisis. For the arrest of the exhausting night-perspirations of phthisis belladonna is as potent as digitalis is in giving tone to a feeble heart." Dr. Ringer was led to try the influence of belladonna on sweating from the remarkable power it exhibits of checking the secretion of milk when applied to the breast. Soon after the publication of his papers,<sup>2</sup> I made at his suggestion some observations with the view of testing the value of hypodermic injections of small quantities of atropia in checking the sweating of phthisis. The drug employed was the sulphate—the dose from  $\frac{1}{200}$ th to  $\frac{1}{100}$ th grain. The conclusions were arrived at as the result of experiments made on sixty patients, who were seen at least twice a day, morning and evening.

<sup>1</sup> *Practitioner*, December, 1876.

<sup>2</sup> "On the Influence of Belladonna on Sweating," *Practitioner*, vol. ix. p. 91.  
"Some Additional Observations on the Action of Atropia on Sweating," *ibid.*  
vol. ix. p. 924

Age, sex, and temperament in no way influenced the results obtained; the injections were successful in men and women, in young and old.

The presence or absence of fever did not influence the result. In nearly all the cases there was some elevation of temperature; in some it was but little above the normal, whilst in others it ranged from 102° to 103° F., or even higher.

The beneficial effects of the treatment are not confined to any particular stage of the disease.

The presence or absence of debility does not affect the result; in some cases the patients were in bed, suffering from great prostration, whilst in others they were well enough to be out of doors the greater part of the day.

The fact of the perspiration having or not having commenced at the time of the injection is of no importance. In a case in which the patient was perspiring very profusely over the whole body an injection was given,—in five minutes the perspiration was very much less, and at the end of half an hour his skin was quite dry.

The benefit derived from the injection lasts in most cases for several nights, so that it need not be repeated every day. An injection once a week or once in ten days will often suffice to keep the perspiration in check.

In many cases the effect of the drug is delayed, no benefit being experienced on the first night, but on the second and succeeding nights the sweating is completely checked. The beneficial effects of the drug, when lasting several nights, appear to pass off gradually, the perspiration coming on earlier and earlier every night. Thus it was noticed that gr.  $\frac{1}{100}$  given at bed-time would often produce no effect that night; on the next night—no further injection being given—the perspiration would be completely stopped; on the third night the patient would be free from perspiration till five or six in the morning; on the fourth night it would begin at two or three A.M.; whilst on the fifth and subsequent nights it would be as bad as ever.

It is not essential to give the injection at bed-time; in fact, in some cases when the action of the drug is required on any particular night, the earlier in the day it is given the more likely it is to prove successful. Sometimes, too, when the

drug is given at bed-time, partial relief is obtained on that night, whilst on the second and subsequent nights the full effects of the drug are experienced.

The injection of atropia has been used with success where oxide of zinc, gallic acid, and other drugs have been tried in vain. The gr.  $\frac{1}{100}$  will often succeed where gr.  $\frac{1}{20}$  has failed. One injection may completely stop the perspiration, and although the patient remains under observation for some weeks, there is no complaint of its return. These cases are not common, but it not unfrequently happens that after a few injections the perspiration, although not completely stopped, is checked to such an extent as to render further treatment unnecessary.

An injection of atropia will often relieve cough when in excess of the amount of expectoration, and thus enable the patient to obtain a good night's rest; but it is not only in this way that the perspiration is checked, for night-sweats are benefited when there is not much cough, and the patient sleeps well.

Patients rarely complain of any unpleasant symptom even when the larger dose is given. Dryness of the throat is a condition so common in sufferers from phthisis that any increase in this symptom, unless very marked, will pass almost unnoticed.

The number of cases in which marked and permanent benefit is not derived even from these small doses does not amount to more than eight or ten per cent. The observations having been made for experimental purposes, the drug was given hypodermically, but in practice it would be found more convenient to give it by mouth, in a proportionately larger dose. It may be given in pill or in solution, or in granules. It is stated by Dr. Aquilla Smith<sup>1</sup> that a solution of sulphate of atropia in camphor water (made with distilled water) will not spoil by long keeping. As to the dose, Dr. Fothergill<sup>2</sup> usually commences with gr.  $\frac{1}{75}$  by mouth, and increases it to gr.  $\frac{1}{25}$ . Speaking from a large experience of the drug, he finds that it may be freely used without apprehension as to any serious toxic effects appearing. "Even with gr.  $\frac{1}{25}$  of atropine the patients," he says, "do not complain much: some dryness of the throat

<sup>1</sup> *Lancet*, August 22, 1874.

<sup>2</sup> *Practitioner's Handbook of Treatment* n. 434.

and a little indistinctness of vision being all; while all prefer these to their dreaded sweats. These effects wear off in a day or two after the drug is discontinued, or even the dose reduced. I have not yet seen any alarming symptoms produced. This I attribute to the gradual increase of the dose; and I have but little doubt that if gr.  $\frac{1}{25}$  were given at first, many cases would show marked toxic symptoms." Dr. J. M. Williamson<sup>1</sup> mentions a case in which the eightieth of a grain given by mouth produced severe symptoms of poisoning. M. Vulpian<sup>2</sup> employs granules each containing half a milligramme (about gr.  $\frac{1}{136}$ ).

Atropia will stop other forms of sweating, such as the sweating of acute rheumatism, prolonged suppuration, convalescence,<sup>3</sup> &c.

Atropia and belladonna check sweating by a peripheric action on the sweat glands, but it is not unlikely that they have also a direct central action.

### III.—GALLIC ACID.

Gallic acid is a useful remedy for night-sweating. It is especially indicated when the patient also suffers from slight but frequently recurring hæmoptysis or from diarrhoea. It is best given in a ten or fifteen-grain dose either at bed-time or three times a day. It is often made into pills with extract of hyoscyamus, the henbane in all probability exerting its own specific influence.

### IV.—QUININE.

Quinine is another useful remedy. It proves of most avail when there is a considerable rise of temperature at some period of the day. It is frequently given in two-grain doses, but five grains are much more likely to succeed. A large dose (eight or ten grains) administered at once or in portions repeated hourly is a good form. A night draught composed of quinine, sulphate of zinc, and sulphuric acid, is also useful (Ringer). It has been

<sup>1</sup> "Observations on the Use of Atropia in Phthisical Sweating."—*Lancet*, July 25, 1874.

<sup>2</sup> Meeting of Academy of Medicine of Paris, November 6, 1877.

<sup>3</sup> *Lyon. Méd.*, November 18, 1877.

suggested that quinine checks profuse perspiration by depressing the vaso-motor dilating nerves, and so contracting the blood-vessels.<sup>1</sup> This explanation is probably incorrect.

#### V.—IRON.

The different preparations of iron have long been used in the treatment of pathological sweating. Sir Thomas Watson says:—"I have frequently succeeded in checking the wasting sweats of phthisis by the tincture of perchloride of iron, given in doses of twenty minims thrice a day, after other expedients had failed me. Steel wine, the ammonio-citrate of iron, the syrup of its iodide, are all good and eligible forms." Reduced iron made up into five-grain pills often succeeds admirably. In a case recently under observation it stopped the sweating after Dover's powder and oxide of zinc had failed. The patient, a young man, had softening at both apices, and had suffered from profuse night-sweats for six or seven weeks. He took Dover's powder nightly for five weeks, the dose being gradually increased from one to fifteen grains without any improvement. During the next three weeks he took ten grains of oxide of zinc every night at bed-time, with very little benefit. He was then ordered two five-grain reduced iron pills nightly, and in a week the sweating had almost ceased. The great disadvantage of iron is that in many cases it is not well borne. Too often it increases the cough, occasions headache and heat of skin, and distresses instead of relieving the patient.

#### VI.—NITRITE OF AMYL.

I have recently made at Dr. Ringer's suggestion some observations on the influence of nitrite of amyl on the night-sweating of phthisis. The patients were seventeen in number, all adults—thirteen men and four women. All stages of the disease were represented; in some cases there was considerable elevation of temperature, whilst in others the lung mischief was latent. The majority of the patients were seen daily for some weeks, and some were under observation for three months. The medicine

<sup>1</sup> *Physiological Therapeutics.* By Thomas W. Poole, M.D.

was given internally at bed-time, the dose varying from a half to three minims. For convenience of dispensing a one in ten solution in rectified spirit was usually employed, but in some cases the amyl was given in suspension in water or on sugar.

In three out of the seventeen cases no benefit was experienced from the treatment. These patients were all men. One had suffered from profuse perspiration all his life, not only at night, but also in the day-time, and he was covered with moisture on the slightest exertion even in the dead of winter. The amyl was given nightly in minim doses for a fortnight without checking the perspiration in the slightest degree. He had previously been treated unsuccessfully with oxide of zinc, hypodermic injections of atropia, and other drugs. On one occasion he was freely rubbed all over with belladonna liniment till his pupils were fully dilated, but the sweating continued as before. The second was a case of advanced phthisis, in which the amyl was given nightly for a fortnight in doses varying from one to three minims without benefit; oxide of zinc subsequently failed. In the third unsuccessful case the patient had hemiplegia and tertiary syphilis, in addition to his lung mischief. The amyl was taken in drop-doses for eight nights and seemed rather to increase than to diminish the amount of perspiration; in this case, too, oxide of zinc was given without benefit.

In the remaining fourteen cases the treatment was successful. The most striking case was that of a young man who had suffered severely from night-sweating for six weeks. A single dose of the amyl stopped them at once and completely for a fortnight. The perspirations then returned, and a single dose again kept them in check for a fortnight. For the third time this was tried, and with like result. It may have been a mere coincidence, but it certainly appeared to be the result of the treatment. In the majority of cases the treatment was less successful. Usually on the first night little or no benefit was experienced, on the next night the perspiration was less, and it gradually decreased in severity night by night till at the expiration of a fortnight it had nearly, if not wholly, ceased, and the patient was able to discontinue the medicine. At the expiration of about a week the perspiration would return, and it

would be necessary to give the medicine again. One of these patients had renal disease in addition to the lung mischief, and another had frequent hæmoptysis. The others were simple cases of phthisis. Most of them were able to take out-door exercise, but two or three were confined to bed.

Nitrite of amyl is a good remedy for night-sweats, but for promptness of action is decidedly inferior to atropia and other remedies.

## VII.—LOCAL APPLICATIONS.

Dr. Druitt<sup>1</sup> finds that in the night-sweats of phthisis, sponging with hot water gives relief, especially if the perspiration begin, as it often does, on one special part of the body by preference, as the chest, hands, or feet. By hot water is meant water as hot as can be borne without pain. It may be used by sponging or immersing, and must be continued till the parts treated are hot, red, and tingling with heat—almost scalded in fact. A good wipe with water at 130° is easily borne; for immersion the heat must be less, but the feelings are the only guide. Dr. Druitt also recommends this mode of treatment when there is a general tendency to perspire to a distressing degree in hot weather, the patient being in good health, and also when there is a tendency to distressing perspiration of some particular part, as the axillæ, hands, feet, &c.

Dr. Robinson Hill recommends sponging the chest with salt solution at bed-time. He finds that in many cases it arrests the night-sweats most completely and satisfactorily.

Sponging the chest and limbs at bed-time with aromatic vinegar and water is also useful, but has its disadvantages. Dr. Elliotson speaks well of a mixture of sulphuric acid and water—a drachm to the pint—as a wash.

The application of belladonna is useful for local sweatings, but when the sweating is general the internal administration of atropia is to be preferred.

<sup>1</sup> "On the Use of Hot Water as a remedy for Profuse Perspiration."—*Med. Times and Gazette*, March, 1865.

## THE THERAPEUTICAL VALUE OF DRUG-SMOKING.

BY REGINALD E. THOMPSON, M.D.

### II. IN ASTHMA.

IN a former communication on the subject of drug-smoking I endeavoured to show that a drug introduced into the system by the air-passages passed more immediately, and consequently with less loss, into the blood-vessels, than when administered by any other method except by the direct introduction into the blood current by means of intravenous injection, the argument being derived from the results of experiments with opium-smoking, minute doses of the drug producing by this method a decided effect.

The disease which of all others invites treatment by this mode of administration is undoubtedly asthma, which must be dealt with as a neurosis, and demands the exhibition of neurotics to combat the spasm which is the characteristic symptom of the disease.

The treatment of asthma must be considered from two points of view : the one being that regard to the general condition of the patient which concentrates the mode of treatment on constitutional remedies, calculated to render the patient less sensitive to the spasmodic attack ; the other being that more limited and immediate consideration of the urgent necessities of the patient which suggests the use of special neurotics to alleviate the dyspnoea.

Whatever view be taken of the disease, the attacks of dyspnoea are dependent upon the constitutional condition of the patient ; they are even aggravated by electrical states of the atmosphere, and according to my experience it is very remarkable how much

worse asthmatic patients are pending the approach of a thunder-storm, at a time when the nerves of many, even those in a condition of health, are out of order, much in the same way perhaps as the wires of the telegraph are unfitted for service from the electrical disturbances around them.

The chief difficulty in treating an individual case of asthma arises from individual peculiarities, which makes the choice of the appropriate neurotic a matter rather of hap-hazard selection, numerous experiments being sometimes necessary before an indication is obtained as to the special drug required; one drug will have a so-called magical effect in one case which may prove inert when used in another, and hence in endeavouring to meet the exigencies of a number of individuals it becomes necessary to combine a number of remedies, and such a combination of drugs becomes more universal in its application in proportion to its complexity, the chance of its proving effectual in any individual case being greatly enhanced by such a composition.

It is a matter of some difficulty to analyse with any certainty those mixtures of vegetable and other substances which are sold as remedies for asthma, but an examination of them shows conclusively that they are composite, different leaves being found on submitting any sample to microscopical analysis; some of them contain opium, others do not; most of them contain lobelia, and it may be stated with some certainty that all of them have stramonium for their basis.

If such remedies are tried in a number of cases it is surprising how one remedy at one time appears to be of the greatest service, another at another time: much depends, doubtless; upon the method of preparation and preservation, and upon the care with which the drugs are selected, and the best secret remedy I know (Himrod's) is evidently well prepared and preserved, the leaves of which it is composed being fresh and green.

Remedies for asthma are supplied in three forms: a powder which is burnt and the fumes of which are inhaled, cigarettes composed of tobacco combined with various drugs, or of paper dipped in a solution of the drugs.

The best method of preparing drugs for the powder form of remedy appears to me to be this: the leaves of the vegetables used

should be procured in good condition and perfectly fresh; they should then be soaked in a solution of nitre (25 per cent.) and the leaves then dried by gentle heat and powdered. I have made use of the various neurotics in this manner in asthma, first separately, in order to ascertain the individual value of the remedy, and then in combination, and the experiments have now been carried on for many months, and I am disposed to place them in the following order of merit:—

Opium.  
Stramonium.  
Cannabis indica.  
Conium.  
Lobelia.

The three first on the list appear to be the most potent by fumigation, but when administered in the wet method (if I may use the term) cannabis indica is so uncertain and so apt to produce delirium, especially in women, that I prefer conium, a drug from which I have obtained extremely good results when administered by the mouth.

With belladonna I could not satisfy myself that any good results were to be obtained by fumigation, and I consider it far inferior to those given above in whatever way it is administered.

The powder may be used by those patients who are not accustomed or object to smoking cigarettes, or it may be added to the tobacco of those who prefer the use of the pipe.

As regards the composition of the powder, I have had good results from gr. ix. of stramonium and gr. i. of cannabis indica, this being a quantity, which will cover a shilling, sufficient for one fumigation.

But if the patient does not object to smoking I much prefer to administer the remedies in the form described in my previous paper, namely, paper cigarettes impregnated with tinctures so that the dose may be accurately apportioned.

It will be understood that in suggesting remedies which serve to alleviate the spasmodic dyspnoea of asthma I do not consider that they constitute a mode of treatment calculated to improve the general condition of the patient, or that they are more than palliatives of an urgent symptom: constitutional treatment by

ferruginous tonics and cod-liver oil, or it may be by iodide of potassium or arsenic, must be resorted to, if it be intended to give the asthmatic patient permanent relief from distressing disease. With acute conditions of the disease, with bronchial complications of such a nature as to contra-indicate the use of iron, there is probably no treatment better for a majority of cases than the use of iodide of potassium with stramonium; in many cases of like character I have derived very good results from the administration of hemlock in combination with the hypophosphite of soda, but for the prevention of the disease I know no treatment to compare with iron and cod-liver oil.

But for soothing and diminishing the dyspnoea, neurotics may be used with great effect; and the following combination is that which, up to this time, has given me the best results.

The same form of cigarette is used as described in my former contribution on this subject, and the paper is soaked in the following drugs according to the recipe here given:—

Extract of opium . . . . .	gr. $\frac{1}{84}$ .
Extract of stramonium . . . . .	gr. $\frac{1}{32}$ .
Tincture of Indian hemp . . . . .	℥ $\frac{1}{2}$ .
Tincture of hemlock . . . . .	℥ 1 $\frac{3}{4}$ .
Tincture of lobelia . . . . .	℥ 1 $\frac{3}{4}$ .
Tincture of tobacco . . . . .	℥ 9.
Oil of anise . . . . .	℥ $\frac{1}{8}$ .
Nitre . . . . .	gr. $\frac{1}{4}$ .

Or for a sheet of Swedish paper sufficient to make sixty-four cigarettes the formula may be given thus:—

Tincturæ tabaci . . . . .	3 x.	.
Tincturæ conii . . . . .	3 ij.	
Tincturæ lobeliæ . . . . .	3 ij.	
Tincturæ cannabis Ind. . . . .	℥ xxxij.	
Extract, opii . . . . .	gr. i.	
Extract, stramonii . . . . .	gr. ij.	
Olei anisi . . . . .	℥ viij.	
Potassæ nitratis . . . . .	gr. xvi.	
Spir. v. r. ad . . . . .	℥ ii. ss.	

This formula, which is a complex one, has only been obtained from repeated experiments, leading step by step to the addition

of some effective remedy, and to the elimination of less effectual drugs.

As it is sometimes desirable not to give opium or Indian hemp, I have had cigarettes made with stramonium and lobelia only; so that altogether I have three different kinds for use: opium cigarettes containing a small quantity of opium and stramonium; a compound opiated cigarette containing the drugs given in the formula above, and a stramonium cigarette without opium.

So many correspondents have written to me for samples of the cigarettes, that I have asked Mr. Rowe (of the firm of Messrs. Stickland and Rowe, Cromwell Place, South Kensington) to make them, and he can supply them. I shall be very glad of any suggestion that will help to make them more serviceable for the relief of asthma

## THE TREATMENT OF HÆMORRHOIDS.

BY F. P. ATKINSON, M.D.

A GOOD deal has of late been written with respect to the operative treatment of hæmorrhoids, and I think in this way attention has perhaps been diverted from the use of topical applications. Of course local treatment by itself is of little use, inasmuch as while the cause remains any benefit that may be obtained can only be partial and temporary. As far as I can see, hæmorrhoids are to be divided into three classes, viz. Acute, Subacute, and Chronic, according to the symptoms and time that they have existed, and the treatment has to be adapted to the stage in which they are presented to our notice.

*In the acute stage* they are inflamed, of a dark red appearance, and give rise to a throbbing, burning pain, or like that which would be produced by the application of a red-hot coal. Mr. Biddle, a fellow-practitioner, tells me that in this stage the effect of calomel-dusting is something wonderful, and that relief is more quickly gained from this than anything with which he is acquainted. He considers that it acts in a twofold manner, viz. upon the liver and at the same time as a local sedative. Sponging also with hot water gives a good deal of ease.

If this treatment prove inefficient, and the pain be very excessive, leeches may be applied to the anus, or an incision made into the centre of the swelling and the contents squeezed out.

*In the subacute stage* the feeling complained of is more that of weight and tension, though on going to stool the pain is often very acute.

To relieve the existing condition, the compound gall ointment or a solution of acetate of lead and opium should be freely and

frequently applied, and an enema of cold water used after each action of the bowels.

*In the chronic stage* the best application is the common pitch ointment. For this useful piece of knowledge I am indebted to a Mr. Corbett, and he, it appears, got the hint from an old nurse by seeing her apply some tarred rope. Its astringent effect is something remarkable, and I know of nothing which acts so quickly and effectually.

*The general treatment* has to be directed towards altering the particular mode of living which has brought about the abnormal condition. Hence all luxurious and sedentary habits, hard riding, venereal excesses, the use of alöetic purgatives, should be forbidden; whilst the object of the *medicinal treatment* should be to keep the bowels freely relieved and lessen as much as possible portal congestion. Dr. Young of Florence wrote a paper in the *Practitioner* of January, 1878, upon the use of glycerine internally in these cases, but I do not think that it has any specific action upon the hæmorrhoids themselves; the improvement which he says takes place is, I fancy, in all probability, simply due to an increased action of the bowels which it produces. Confection of senna is a particularly useful and by no means unpleasant aperient in these cases. I would, however, rather suggest the use of a euonymin pill occasionally at night with a dose of effervescing Carlsbad salts in the morning, as these have a direct effect upon the portal circulation. In conclusion, I would remark that I cannot speak too strongly with regard to the effects of the pitch ointment, for I feel certain that the necessity for operative measures may often be prevented by its timely use, and I would recommend every one to give it a trial where the compound gall ointment is ineffectual.

## RECENT RESEARCHES ON THE NATURE OF MALARIA, WITH REMARKS ON THE MODE OF ACTION OF QUININE.

THE nature of malaria has long been a subject of much speculation, and although malarious diseases are fortunately no longer of the same importance as formerly in this country, they are still of much practical interest, for when malaria has once obtained a hold over a patient it tends more or less to modify every future ailment. The researches which have recently been made on this subject by Professor Klebs and Signor Tommasi-Crudeli,<sup>1</sup> seem to have done much to settle the question, and by desire of Signor Tommasi-Crudeli we translate them for the benefit of the readers of this journal:—

“All the knowledge which we possess regarding maladies of malarious origin shows that in those regions where the ground is in the proper conditions of humidity and warmth these morbid processes manifest themselves in great proportions. The true cause is to be sought for in the soil itself. When the surface of the soil in which the poison is developed becomes dry, and the evaporation from the sub-soil becomes very active, the poison can rise into the atmosphere to different heights under the influence of ascending currents of air. The substance which causes malaria is not equally developed in soils of the same composition and the same moisture, and this has repeatedly led to the belief that it is a specific organism, which not only requires favourable external conditions for its development, but the presence of a germ to give it birth. But the conditions

<sup>1</sup> “Sulla natura dell' agente specifico che produce le febbri da malaria. Nota del Prof. Klebs e del Socio Tommasi-Crudeli, letta nella seduta del 1 giugno 1879.” *Reale Accademia dei Lincei. Estratto del vol. III. anno 1879.*

under which malaria is produced in the soil are not such as to disprove the others hypothesis that it is due to the formation of gaseous products in the soil, rather than to organisms such as in the last ten years have begun to be recognised as the causes of other infective diseases. Which of those two hypotheses is the true one is an inquiry of great scientific as well as great practical importance. After the meeting of naturalists at Cassel in September, 1878, we proposed to undertake this study during the spring of this year in the Campagna, and we then established the method which we have adopted in our researches. One of us (Tommasi-Crudeli) has already read an account before the Academy of the preparatory work intended to settle the mode in which foci of malarious infection are produced in that part of the Campagna in which we find no evident signs of water. On the 9th of April we commenced the first series of researches which we proposed to make together, and which we have been enabled to complete in a comparatively short time with the aid of D. Onorato Caetani, the Prince of Teano, the Signori Allesandro and Tito Piacentini, and the Senator Cannizzaro, to whom we owe our most cordial thanks. The method we have adopted in this research is the same as one of us (Klebs) has employed to settle other pathological questions of a similar nature. Firstly, the action upon the living organism of various sorts of earth, air, and water of malarious places was investigated. We afterwards separated the solid from the liquid parts of the substances which had been recognised as capable of producing malarious infection, in order to discover separately the morbid action of each. These successive-operations were performed in three ways—(1) on the hypothesis that malarious diseases are generated by parasitic organisms, we tried if possible to develop them either entirely, or to a great extent, by placing the substance containing the malarious poison under the same conditions which experience had demonstrated as favourable to their production. The soil, for example, was long exposed to air at the temperature of 30° to 40° C. during the day thus ensuring a rapid evaporation from the superficial layers, the deeper layers were kept very moist. (2) An exceedingly small quantity of infective material prepared in this way, and also of material which had undergone

no preparation, were placed in various cultivating fluids, and we then tested the morbid action of the product of this first cultivation. We then tried whether the products obtained by successively cultivating minute quantities of the first product in new cultivating solutions exercised the same morbid action as the first product itself. Being successful in this, we next attempted to discover what parts capable of organic development contained in the primitive infective substance could be considered causes of the morbid process which they produced, since in the last crop of the series there was no trace, or at most only an exceedingly minute one, of the substances incapable of organic development contained in the primitive infective material. (3) Finally, we proceeded to separate mechanically the fluid parts from the solid microscopical parts contained in the natural liquids and the liquids produced by cultivation, when we had discovered that these liquids were capable of exerting a specific morbid action. The separation was effected by filtering the liquids through filters of plaster of Paris and other filters, so that one could discover separately the action of the filtrate and of the residue remaining in the filter. All this was done according to the methods originally followed by one of us (Klebs) and afterwards by Pasteur.

The morbid action of all these various substances was tested by injecting them into the sub-cutaneous cellular tissue of rabbits, and tracing a curve of the temperature from observations made for two hours, and finally making post-mortem examinations of the animals. The three points which we sought as proofs of their action were the regular intermissions of temperature, the swelling of the spleen, and the absence of the pathological alterations due to other diseases. The results of our observations may be summed up as follows:—

1. The malarious poison is found extensively and in great quantity in the soil of malarious regions, even at a season in which it does not usually produce malarial fever in man.

2. This poison may be gathered in such seasons in the strata of air which are found in immediate contact with the surface of the soil in places favourable to its production. In order to collect it we employed a powerful ventilator by which 300 litres of air gathered from this stratum were driven in a

narrow column with great force and velocity against a plate of glass covered with a solution of gelatine and placed in a little box. From this box the air was allowed to pass out after it had deposited upon the gelatine of this glass plate all the solid particles which it held in suspension.

3. Stagnant water in malarious regions does not seem to contain the malarious poison at this season, although it may, like that of the lake of Caprolace, for example, be very rich in low organisms. On the other hand, our researches demonstrate that a large quantity of water hinders the development of the malarious poison by rendering its germs inactive.

4. Our experiments on animals have given the following result. The injection of liquids obtained directly from the soil, or from artificial culture, and of the residue obtained by filtration from the cultivated liquids, always caused in the animals experimented upon a fever with a typically regular course, and with intermissions which, in some cases, lasted as long as sixty hours, and with a rise of temperature during the febrile stage which might attain  $41^{\circ}8$  C. The temperature was always measured in the rectum, where the normal temperature of rabbits is  $39^{\circ}5$  C., and oscillates within limits of a few tenths of a degree.

The filtrate from the liquids, even when injected in quantities five times as great as that of the liquids themselves, produced only slight increase of temperature of an intermittent character, or only a slight febrile condition immediately after the injection. It was found, indeed, that this negative result could be obtained even by simple filtration through doubled paper, so that it seems that the active particles of the liquid containing the malarious poison are retained upon the filter more easily than those which constitute the active principle of other infective poisons, such as that of malignant pustule and septicæmia. Some of our animals into which no malarious poison was injected, but which had become incidentally affected with septic poison, showed a temperature curve quite different from that of animals infected with malaria. In this curve could be seen gradual elevations of the temperature, which lasted a pretty long time, or a continuous increase of alternating irregular curves. In all the animals infected with malarious fluids we found, without exception, very notable swelling of the spleen. In healthy rabbits

the spleen, we found it to be 4 centimetres long, .8 centimetres wide, and .3 thick. The same dimensions in an animal which died in thirty-six hours, in consequence of an injection repeated twice, are as follows:—Length, 8.3 centimetres; breadth, 2.3; thickness, 0.9; so that the organ was nine or ten times as large as usual. The smallest spleen in the infected animals was 6 centimetres long, so that this dimension alone was one half larger than the normal. In many of these spleens, especially in grave cases, we found black pigment in large quantities, as in the melanic patches, which are produced in man in consequence of malarious fevers.

The organisms which, according to our observations, are to be regarded as the true causes of malaria, since they are to be found in the infective liquids obtained by the earth from the air, and by cultivation as in the bodies of infected animals, belong to the genus *Bacillus*. In the soil of malarious regions they are found in the form of numerous spores, which have the power of independent motion, and strongly refract the light. They have an elongated oval figure, and a maximum diameter of 0.95 micro-millimetres. They develop either within the body or in cultivating apparatuses into long filaments, which at first are homogeneous. Later on, these filaments undergo transverse fission, which converts them into a chain, and in the interior of each link new spores develop. The first formation of these spores is parietal, but finally almost the whole interior of the link becomes filled with these little bodies. This morphological property seems to correspond to a particular species of bacillus, which we propose to call *Bacillus malariae*, since we have seen it develop within the bodies of animals infected by malaria.

In regard to the biological properties of this plant we may mention besides that it requires for its development the presence of free oxygen, and perhaps belongs to Pasteur's class of *aerobii*. It does not develop in water, but does so in liquids rich in nitrogenous substances, such as solution of gelatine or albumen, in urine and in liquids of the organism. Its greatest development in the body of infected animals occurs in the spleen and medulla of the bones, which in some of our cases contain long and homogeneous filaments which measured 0.06—

0·084 millimetres in length, and ·0006 millimetres in diameter. This circumstance is noteworthy, since it is precisely in these organs that the most characteristic anatomical alterations are to be found, in consequence of grave malarious fevers in man."

These researches of Klebs and Tommasi-Crudeli go far to decide the controversy which has long raged regarding the origin and nature of malaria, and to settle this vexed question in favour of malarious poison being a vegetable organism of low organisation. In 1866 Salisbury published a paper in the *American Journal of Medical Sciences*, in which he thought that he had shown the malarious poison to consist of the spores of *palmella*, a species of alga. He was led to this belief by finding in the sputa of persons suffering from malarious fever elongated cells with distinct nuclei, which occurred either singly or in groups. He obtained them also by collecting the dust from the air of malarious places upon plates of glass. These spores, he considers, rise chiefly from the earth during the night with the moist vapours which exhale from the ground after sunset. Shortly after sunrise they again fall to the earth. In the latitude of Ohio they seldom rise more than 35 to 60 feet above the low grounds, while in more southern regions they may rise 100 feet, or even more. The spores are not to be found, and malarious infection does not exist, above the height to which the cold vapours ascend. During the day the air is quite free from the spores and from malarious poison. By placing pieces of earth containing the poison in the open window of a bedroom he succeeded in producing malarious fever in four out of five healthy persons on whom he experimented in a district which was free from malaria. These experiments of Salisbury were repeated by H. C. Wood and Leidy with a totally different result, for they slept for months in rooms where various species of *palmella* were being cultivated, and swallowed them by thousands without getting intermittent fever, although Wood considers himself exceedingly liable to this disease. Moreover, the *palmella* contains chlorophyll, and requires light for its growth, and therefore cannot thrive in the animal body. Wood and Leidy appear thus to have shown that Salisbury was wrong in regarding the malarious poison as a *palmella*, but he may

nevertheless have been right in looking upon it as a kind of alga.

In 1875 some researches were made by M. Lanzi and G. Terrigi on the nature of malarious poison, which led them to regard the poison as of vegetable origin. Lanzi conducted his investigations in the Campagna of Rome and the Pontine Marshes. In the cells of algæ found in those localities, a number of small dark granules are to be found in the endochrom, or in the chlorophyll of such algæ as contain it. These granules, sometimes alone and sometimes in little dark masses, become more numerous as the algæ wither, and finally completely fill the cells of the plant, which then entirely lose their green colour and appear black under the microscope. At the same time the algæ begin to stink and putrify. This process, which Lanzi followed in his aquarium, occurs every year on a large scale in the Roman Campagna. In winter numerous marshes are formed, which soon become filled with the algæ, and in spring these begin to thrive luxuriantly. In summer the water retires, leaving behind it large tracts which are covered with a continuous layer of decomposing algæ, and afterwards this ground becomes covered with phanerogamous land-plants. About autumn the algæ die on those parts which still remain covered with water also, and the bottom of the marshes is converted into a layer of decomposing slime, in which the existence of the dark-coloured granules already mentioned can be discovered everywhere by the microscope. In addition to this, the bacterium *terre* and *vibrio serpens* are to be found in great abundance, but Lanzi believes that their existence is not due to decomposition of algæ, but of dead animals. Even in those parts of the Roman Campagna where, in spite of the absence of real marshes, the most marked malaria still exists, as for instance, in the principal part of the valley of the Tiber, where there is no marsh for 100 kilometres, the conditions are easily to be found which lead to an extensive withering of vegetable matter. Even where there are no marshes there are extensive tracts of uncultivated land which in spring are under water, either on account of inundations of the Tiber or of heavy rains, and the vegetable products of these immediately wither after the water has dried up in the course of the summer. These dark-coloured

granules which result from the withering of algæ and other vegetable matter, are regarded by Lanzi as possessing the nature of a ferment. They are to be found everywhere in abundance in the atmospheric dust of the Roman Campagna, and are capable of a rich development by artificial culture. Lanzi regards these granules as identical with the pigmented *Sphærobacteria* of Cohn, and the *Bacteridium brunneum* of Schroeder. When they were cultivated they generally yielded a crop of *Monilia penicillata* of Fries. The pigment granules which are found in the liver and spleen of persons suffering from malarious cachexia possess exactly the same properties as those ferment-like granules produced by decaying vegetables, and Lanzi is strongly of opinion that this black pigment, or so-called malarial melanin of the pathological anatomists, is identical with the granules arising from the decomposition of decaying plants. He succeeded, indeed, in producing zooglœa-like vegetation by cultivating the pigment from melanæmic livers. Malaria-melanin was also found by Terrigi in abundance in the liver and spleen of guinea-pigs which had been allowed to inspire the organisms contained in the air of the marshes for some time. Terrigi, who had undertaken the microscopic examination of withering algæ along with Lanzi, also examined the height to which the spores arise above the surface of the marshes, and he found that they do so to the height of fifty centimetres, a height at which they are readily caught by the winds sweeping over the marshes and carried away. Terrigi also examined the effects of various disinfectants upon the decomposition of the algæ, and the development of the *Bacteridium brunneum*. The drugs examined were quinine, chloride of lime, lime, sulphur, sulphate of soda, carbolic acid, sulphate of iron, arsenic, permanganate of potash, and chloral. The best of these was chloride of lime, then lime and chloral, and the other disinfectants were more or less inactive.

We thus find a general consensus of opinion amongst Salisbury, Tommasi-Crudeli, Cohn, Lanzi, and Terrigi, as to the vegetable nature of the malarious poison, although they may differ as to the exact species of algæ composing it, and at last we are able to get some notion of the mode of action of quinine in malarious disease. Besides the curious intermissions of ague,

there are other points about malaria which seem very puzzling. One of these is the way in which malaria may again exert its power after a long interval when the system becomes depressed from other causes. This phenomenon may be explained by the observations of Lussana. He found that poisons taken into the stomach do not at once pass into the general circulation, and, indeed, when taken in small quantities, may never get into it at all. They are absorbed, indeed, from the stomach, and carried

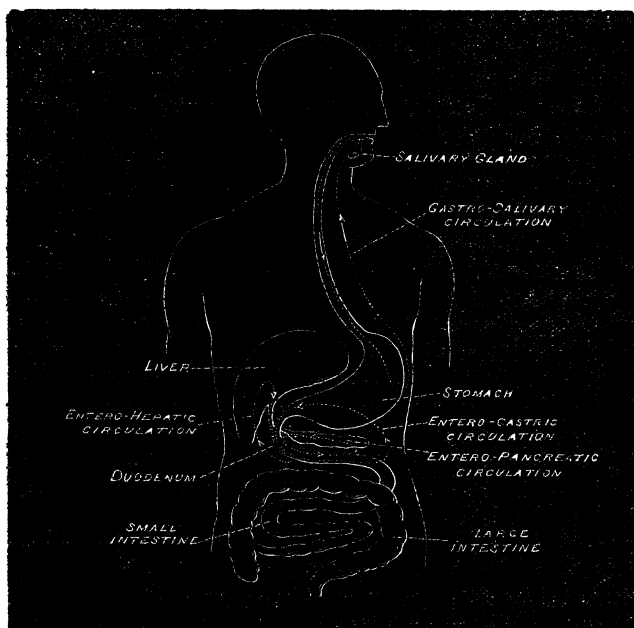


Diagram showing absorption from one part, and excretion from another part of the intestinal canal.

by the blood of the portal vein to the liver, but here their course is arrested. They are removed from the blood and excreted by the liver with the bile. Along with the bile they pass into the duodenum, and, after traversing it for a certain distance, they are again re-absorbed, carried a second time to the liver, and a second time re-excreted. Thus they may go on in a continual round, never passing through the liver, and thus never getting into the general circulation. When the quantity

of the poison, however, in the portal circulation is too great, the liver is unable to return the whole of it, and so a part of it, passing into the systemic circulation, will reach the nerve-centres, and thus produce its poisonous effects. The poison with which Lussana chiefly experimented was curare, but metallic poisons were also excreted in the same manner, and what is true of them Lussana believes to be true also of the ague poison. If this poison really consists of the spores of a species of bacillus, these will probably during respiration be deposited upon the mucus covering the mouth, and nares, in the same way that they were upon the gelatine plate in Tommasi-Crudeli's and Cohn's researches. The mucus may be swallowed, and the spores, being absorbed from the stomach, will be carried by the portal vein to the liver; there they will be absorbed, and part of them return with the bile to the duodenum, from which they will again undergo absorption and re-excretion by the liver. But it is probable that the whole of them will not be re-excreted. Some of them will be actually destroyed in the liver, for Schiff and Lautenbach have shown that this organ possesses the power of decomposing several organic poisons, and it is not improbable that it may decompose the malarious poison as well as other poisons. So long as the conditions in the portal circulation are such as to prevent the spores from ever becoming so numerous as to pass through the liver, they may indeed cause direct changes in that organ, and secondary changes in the other organs connected with the portal circulation, but being unable to get into the general circulation, they will not produce any well-marked malarious manifestations. Should, however, their number increase, either because from their natural tendency to multiply after certain intervals, new crops arise, or because some alteration in the composition of the portal blood should especially favour their growth, they may pass through the liver, and, entering into the general circulation, may produce a fever fit. The same might occur if the pressure of blood in the systemic circulation were much lessened, as, for example, after hæmorrhage, weakness from long fasting, debility from an attack of acute disease or general nervous depression which by lowering the tone of the vasomotor system will lessen the blood-pressure in the systemic vessels. For then the portal blood

would pass more quickly into the vena cava, and might carry with it a portion of the spores. So long as the tension in the vessels generally is high, there will be comparatively slight tendency for the blood to pass from the portal into the systemic circulation, and, besides, the vessels of the liver may partake in the general tension, and thus present a greater obstruction than usual to the passage of spores through them.

This may explain a condition which I have twice had occasion to observe. Two men, both of strong physique and powerful will, were obliged to spend some time in excessively malarious districts. They were told beforehand that they would certainly get ague badly, but their work being of a very urgent nature, both declared that they would not take ague, that they had not time to take it, and, truly enough, neither of them took it while they were in the malarious district, though their men were falling daily all around them. So soon, however, as they had left the district, having finished their work, and the mental tension which had kept them up was over, they were prostrated by ague.

It has also been found that men who have been in malarious districts will afterwards die of malarious fever, although they have never had it while in the district itself. Such occurrences as these are readily explained on the supposition of Lussana that the ague poison remains circulating, as a rule, in the portal blood, and only occasionally gets into the general circulation. The tendency also of the malarious poison to show itself after long intervals whenever the system becomes debilitated or diseased, and to give to the disease an intermittent character, is also to be explained on the supposition that the malarious spores, once in the body, are never completely destroyed, although their number may be reduced to a minimum, so that whenever the conditions again became favourable to their development and passage into the general circulation, they may make their presence manifest by their action upon the nervous system. It may be said, however, that it is very unlikely that spores will in themselves act upon the nervous system, and it is quite possible that they do not. Their mode of action may be not direct, but indirect, *i.e.* instead of themselves acting upon the nervous system, they act upon it by means of the substances

they produce in the fluids of the body during their growth. They may indeed have an action like a ferment, as supposed by Lanzi, and just as the spores of the yeast plant in the portal circulation would probably not act upon the brain and nervous centres directly, but only indirectly, through the alcohol to which it might give rise by its growth, so the malarious spores produce in their growth various products in place of alcohol whose nature is to us as yet unknown, but which, and not the spores themselves, are the direct cause of the malarious phenomena. On this supposition, too, we can see the *modus operandi* of quinine, and of emetics and purgatives in the treatment of ague. The quinine, when swallowed, will be absorbed like the spores themselves, and, by preventing their multiplication or actually destroying them, will tend to prevent their getting into the general circulation, and there doing mischief. We can understand, also, the action of quinine as a prophylactic, because if steadily taken, the spores when swallowed will find themselves in a fluid unfavourable to their growth, and thus be prevented from multiplying at all. But quinine sometimes does not act, or does not act at all well, unless its action be aided by the use of an emetic or purgative. These remove from the body a quantity of bile, and with it they will probably remove a number of malarious spores, and the multiplication of those which are left may be controlled by means of quinine, although previous to the removal of the bile the quantity of spores contained in the portal circulation was too great to be kept completely under by the quinine. In places where quinine is unknown, or not readily obtained, as in Morocco, ague is cured by the use of emetics and purgatives alone.

We shall look with great interest for further researches on this subject, not only on account of the importance of malaria as a cause of the disease, but also because of the interest which attaches to the mode of action of such a drug as quinine, whose beneficial effect is more distinct than that of almost any other drug in the pharmacopœa, and yet whose *modus operandi* has hitherto been completely inexplicable.

## Reviews.

*A Manual of Midwifery for Midwives.* By FANCOURT BARNES, M.D.

THIS manual, which is carefully compiled, is, however, not well suited to its object. The task—a difficult one for any man—is, we think, only to be undertaken with any hope of success at the end of such experience, both of practice and teaching, as will justify a man in being dogmatic and authoritative. Besides this the instruction of midwives should be partial, and should be co-extensive with their province, which is limited. In a book of 172 pages, natural labour occupies only ten, while abnormal pelves occupy six pages.

*Minor Gynecological Operations and Appliances.* By J. HALLIDAY CROOM, M.B.

THIS book will be found useful to the busy practitioner. We may take exception to the coloured frontispiece representing the well-known “ulcerated womb” in various stages in colours too bright and vivid, but the matter of the book, unlike the frontispiece, is sober and plain. Both student and practitioner will find in it descriptions, hints, and directions clear, practical, and useful.

*Lectures on the Diseases of Women.* By CHARLES WEST, M.D.  
Fourth edition, with numerous Additions by J. MATTHEWS DUNCAN, M.D.

THE value of this work in its former editions has long been recognised. It has the advantage of many additions by Dr. Matthews Duncan, who has largely contributed to the more recent references throughout, though the quantity of his handiwork in the book by no means amounts to what the reader would expect from the title on the back of the volume: “Diseases of Women, West and Duncan.” The chapters on cancer are to our mind the best in the book, and are excellent; those on diseases of the ovary not so good; while those concerning the vagina and vulva are too short to suffice for the knowledge of the student or the reference of the practitioner. On the whole, however, the clinical value of the book is great.

*A Handbook on the Diagnosis of Skin Diseases.* By ROBERT LIVEING, A.M. & M.D. Cantab., F.R.C.P. London. Longmans, Green and Co., 1878.

DR. LIVEING has, in this work, confined his remarks to the symptomatology of skin diseases, a subject of great practical importance, and has produced a volume which is highly creditable to English dermatology. A useful feature in the book is a reference to the most accessible skin atlases for portraits of the rarer affections. The work is brought up to the level of the latest acquirements in this department of medical practice.

*Localization of Cerebral Disease.* By DAVID FERRIER, M.D., F.R.S. 8vo. pp. 142. London: Smith, Elder, & Co.

*Étude historique et clinique sur la trépanation du crâne la Trépanation Guidée par les localisations cérébrales,* par le Dr. JUST LUCAS-CHAMPIONNIÈRE. 8vo. pp. 150. 14 illustrations. Paris: V. A. Delahaye et Cie.

*The Brain and its Diseases. Part I.—Syphilis of the Brain and Spinal Cord, showing the part which this agent plays in the production of Paralysis, Epilepsy, Insanity, Headache, Neuralgia, Hysteria, Hypochondriasis, and other mental and nervous derangements.* By THOMAS STRETCH DOWSE, M.D. 8vo. pp. 144. London, Paris, Madrid: Baillière, Tindall, & Cox.

ALTHOUGH the credit of making the first experiments on cerebral localization is due to Fritsch and Hitzig, our knowledge of the subject is chiefly due to the extended researches of Dr. Ferrier, and we therefore welcome an application of physiological discoveries to the pathology of disease from his pen. The present work consists of the Gulstonian Lectures which he delivered before the College of Physicians, slightly amplified and illustrated by woodcuts, which add very greatly to its value, as they enable one to localize at a glance the cerebral lesions whose position would otherwise be almost unintelligible to the ordinary reader, and one is thus enabled with ease to connect with each lesion its corresponding symptoms.

In the first lecture the author discusses the general question of the localization of faculties in the brain, and refutes the objections which might be raised to this localization. He then considers the effect of lesions of the frontal lobes, and gives a most full and interesting account of the celebrated American crowbar case, in which a crowbar was blown through the head of a man engaged in blasting a rock, entering at the left angle of the jaw and passing clean through the top of his head. This is sometimes referred to as a case in which this extensive injury to the brain produced no effect, but Dr. Ferrier shows that it

completely altered the man's character, destroying the equilibrium between his intellectual faculties and animal propensities, and changing him from a shrewd, energetic, and persistent individual, into a capricious, vacillating, and passionate being, uniting the intellectual capacity of the child with the animal passions of the man.

In the second lecture Dr. Ferrier treats of the motor area of the brain, and the paralysis which is produced by injuries to its various parts. He shows that the effects of destruction of the limited areas in the cerebral convolutions by hæmorrhage or softening produce results similar to those which he has himself observed in his experiments upon animals. Thus, monoplegia of the leg, or of the arm and leg, indicates a lesion of the upper extremity of the ascending convolutions close to the longitudinal fissure; brachial monoplegia of the upper part of the ascending frontal convolution, or of the ascending parietal convolution if the paralysis affect the hand more particularly; brachio-facial monoplegia of the mid-fronto-parietal region; and facial and lingual monoplegia with or without aphasia of the lower part of the ascending frontal convolution at its union with the third frontal.

In the third lecture irritative lesions of the motor area and the resulting epilepsy and spasm are considered, and here again it is shown that the lesions observed in disease correspond with the results of experiments. The latter part of the lecture deals with lesions of the sensory area and of the occipital lobes. The localization here is shown to be less easily made out, and to be of a less definite character, than in the case of the motor areas; but nevertheless the affections both of ordinary touch and of the special senses are shown, in many instances at least, to correspond with lesions of the sensory areas, as ascertained by Dr. Ferrier himself in his experiments upon animals.

Short though the book is, it forms the most important contribution that we have yet received to the localization of cerebral disease, and is well worthy of the author's reputation.

Dr. Championnière's work gives us a glimpse of the practical results likely to be obtained by a localization of the cerebral faculties. He discusses the operation of trephining from the earliest times, and shows that it was practised, and successfully too, by men living in the Stone age, for skulls of this period have been discovered whose owners must have survived for a considerable time after the operation, as the edges of the apertures had become completely smoothed and rounded by absorption. He gives numerous cases illustrative of the use of trephining, and shows how the symptoms indicating lesion of a certain area in the cerebral cortex may indicate where the trephine

ought to be applied. He gives no cases of trephining for cerebral tumours, but it seems not improbable that ere long such an operation may be recognised as a usual means of treatment.

Dr. Dowse's work commences with a chapter on the history and nature of syphilis, and then discusses the diagnosis of the disease in the brain, spinal cord, sympathetic system, and peripheral nerves. In the case of the two latter the main points of distinction between syphilitic and non-syphilitic disease are considered by the author to be the presence or absence of nocturnal pains and the effect of mercury in giving relief or not. The chief points indicative of syphilis as a cause of brain disease are the unstable character of the symptoms, tendency to spontaneous resolution and curative power of mercury. Paralysis depending on embolism, thrombosis or hæmorrhage, is usually sudden and complete, while syphilis is slow in its working, alternately progressive and retrogressive. In the chapter on treatment he draws attention to the necessity for prefacing treatment with mercurials or iodide of potassium by a previous course of tonics in cases of syphilitic lardaceous disease. These are not unfrequently co-existent with gummatous cerebral changes and great depression of the sympathetic and vaso-motor centres. The urine is highly phosphatic, large in quantity, of low specific gravity, but containing an excess of urea, slightly alkaline and albuminous, but giving no evidence of organic disease in its deposits. In addition to this there will be cardiac depression, hepatic derangement, and congestion of the respiratory tract. In such cases the author gives perchloride of iron and compound scammony-powder for some weeks before giving mercury, and even then combines it with bark. To patients with whom iodide of potassium given by the mouth does not agree, the author administered it in the form of a bath, but it is doubtful whether the benefit he has observed is not to be attributed to the bath alone rather than to the iodide. For he uses a douche after the bath, and all careful experiments on absorption have shown that iodide of potassium is not absorbed when in solution, and only undergoes absorption when allowed to dry upon the skin and become mixed with the sebaceous secretion. The next chapter deals with hereditary syphilis, syphilitic epilepsy, and pathology. In the chapter on pathology (p. 88) the author indulges in what we regard as a somewhat unfair sneer at the importance attributed by some authors to the results of experimental inquiry into the functions of the brain.

The work contains much valuable information regarding both the diagnosis and treatment of syphilitic affections of the brain, and its usefulness is increased by careful records of many instructive cases.

## Clinic of the Month.

**New Method of Preventing Cystitis after Cantharides.**—M. Guyot Dannecey recommends the incorporation of a certain quantity of carbonate or bicarbonate of soda in place of powdering blisters with camphor, as is generally done. For this purpose he mixes equal parts of carbonate of soda and cantharides powder, and then spreads the mixture upon the plaster. The blister is fixed by strong pressure with the palm of the hand, and is covered with a layer of oiled silk. The vesicant acts as rapidly and as surely as one made with the simple powder of cantharides without any admixture with other substances. The experience of the many years during which it has been in use at the Bordeaux hospitals tends to show that the addition of the soda salt is a much safer preservative than camphor against those accidents to the neck of the bladder which occur so frequently after the application of blisters, whether or not they have been previously camphorated. (*Le Progrès Médical*, May 31, 1879.)

**Treatment of Opium Poisoning by Atropin.**—The patient, aged 35, had taken about six drachms of tincture of opium an hour before admission to the Leeds General Infirmary. When first seen he was able to answer questions, though his manner was irritable; the pupils were contracted. Sulphate of zinc failed to produce vomiting, and the stomach-pump was consequently applied, and by it twelve ounces of brownish fluid were withdrawn. Strong coffee was injected into the stomach, and the patient was walked about the corridors. As his condition became worse the pulse being 120, respiration 15, and the pupils contracted to a pin point,  $\frac{1}{10}$  of a grain of sulphate of atropin was injected, and the patient was allowed to lie down. Immediately the condition slightly improved, and continued so for about ten hours, after which a relapse was experienced. The further injection of  $\frac{1}{2}$  grain caused a slight improvement, the pulse being 130, and the respiration rising from 11 to 18. No return of consciousness, however, took place, the extremities were cold, and the sleep more natural. After an interval of half an hour

the respiration suddenly sank to 12, but rose again to 20 after artificial respiration had been kept up for about ten minutes. The pulse was good, and the surface of the body warmer. From this time the patient slept for about fifteen hours, and though attempts were made at intervals to rouse him, they were only partially successful. On awakening he was able to answer questions put to him, took some breakfast, and from that time had no further trouble, and continued quite well till the date of his discharge from the hospital. (*The Lancet*, June 14, 1879.)

**Treatment of Scrofula and Tuberculosis.**—Dr. Jules Regnard has prescribed the chlorhydro-phosphate of lime in a case of tuberculosis after scrofula in a child with the greatest success. The preparation was given to the extent of a tablespoonful at each meal without any other treatment except careful dietary, fresh air, sunlight, and exercise. Commenting upon this case, Dr. Regnard wishes it to be distinctly understood that he has no intention of throwing into disrepute other modes of treatment. That phthisis is not a simple disease is well known. There appears to be one dominant condition more especially marked at the commencement of the disease—a general poverty of the system, which, at first a result of the disease, at a later period favours its further development. It is in this state that the beneficial effects of the chlorhydro-phosphate of lime are most chiefly noticeable. This remedy restores and stimulates the appetite, which has been long lost to a greater extent than any other. It facilitates digestion and assimilation, and it acts directly upon the general as well as upon the local conditions. Side by side with this dominant affection, however, various symptoms call for special treatment. Thus in the majority of cases creosote is used for the purpose of moderating expectoration, and because it appears to possess a kind of topical action. Sulphate of atropia gives good results in sweating. In certain cases, too, arsenic is beneficial, and every one has experienced the remedial effects of hygienic treatment, and a change of scene chosen judiciously for each case. Cod-liver oil, which is so generally employed, may also afford great benefit whether it be used alternately with the chlorhydro-phosphate of lime, or simultaneously with that remedy, by rendering its digestion more ready. No means should therefore be left untried, but, although varying symptoms should be treated with a variety of remedies, the chlorhydro-phosphate of lime should be employed in every case of simple phthisis. (*Le Progrès Médical*, June 7, 1879.)

**Formula of Podophyllin.**—Dr. Dobell states that from a very long and extensive experience he can confidently affirm that none of the accidents and inconveniences which so commonly attend the administration of podophyllin ever arise when the

drug is prescribed according to his method. On the contrary, it is one of the most satisfactory and reliable of our medicines. The formula given is: *R. podophylli, gr. ij. ; essentia zingiberis, ʒij. ; spiritus vini recti ad ʒij. Fiant guttæ.* A tea-spoonful to be taken in a wineglassful of water every night at bedtime, or every second, third, or fourth night as required. (*The British Medical Journal*, June 14, 1879.)

**Euonymin and Iridin.**—The former obtained from *Euonymus atropurpureus*, and the latter from the *Iris versicolor*, both indigenous plants in the United States, have lately been brought before the notice of the profession by Professor Rutherford of Edinburgh, in his report to the Scientific Grants Committee of the British Medical Association. He classes them as feeble intestinal stimulants. Mr. Barnes has administered these drugs in thirty or forty cases, giving one grain of euonymin or four of iridin in the form of a pill. In every case except one purgation followed, and in this exceptional instance the patient had been on a prior course of an astringent preparation of iron. There was little difference relatively in the action of the two drugs. Each generally produced from one to two evacuations (though in one case eight or nine) which were generally yellow coloured. The pill was usually administered at bedtime, and no action of the bowels would then take place until the following morning: sometimes it was even some hours later. The slight depression which is said usually to follow their action was not complained of by the patient in a single instance: in fact rather the reverse occurred, the tongue rapidly cleaning, and the patient feeling more cheerful. It would seem from the above facts, that these drugs act by inducing increased functional activity of the liver, and so causing an increased secretion of the biliary fluid, the natural purgative. (*The British Medical Journal*, June 21, 1879.)

**The Treatment of Acute Rheumatism by Salicin and Salicylic Acid.**—Dr. MacLagan commenting upon the treatment of this disease by the method which he introduced but three years since, and which has come into such general use, notices that salicylic acid and salicylate of soda not unfrequently give rise to considerable and even alarming depression. Such an untoward effect, he states, is not produced by salicin. From a therapeutic point of view this is one of the most important points of difference between the two remedies. In a disease such as acute rheumatism, in which the heart is apt to be involved, the absence of this tendency to cause depression points out salicin as a much safer remedy than salicylic acid. The full beneficial effects of salicin and salicylic acid in acute rheumatism can only be obtained by the administration of salicin.

doses frequently repeated—twenty to thirty grains every hour repeated every two, three, or four hours as the symptoms decline. By smaller doses—ten to fifteen grains every hour or every two hours—an attack of acute rheumatism may be arrested in two or three days, but let the remedy be given in the larger dose, and the progress of the disease may be arrested in half the time. In maladies which involve the heart and entail on the patient the terrible results of an endocarditis, every hour is of importance. Cut the malady short in one day, and the cardiac complications which may appear if it lasts for two or three may be warded off. It takes about an ounce of salicin or of salicylic acid to cure a case of acute rheumatism. The sooner this quantity is got into, or, rather, is passed through, the system, the better. For this reason Dr. MacLagan now gives 30 grains every hour. By the time that an ounce has been taken, *i.e.* in sixteen hours, the patient is generally free from pain, and the temperature at or near the normal. He then gives 30 grains every two or three hours till another ounce is consumed. After that thirty grains are given three times a day for a week or ten days, to guard against the possibility of a relapse. Not unfrequently the patient feels better after three or four powders have been taken, and is practically out of the attack before the ounce is consumed. In such cases the interval between the doses may be widened after six or eight have been taken. Such is the course of events in favourable cases, and almost invariably this is the course in young subjects who have not previously suffered, or have only done so once or twice. In older subjects, who have had frequent and long-continued attacks, the acute symptoms may be as speedily allayed, but convalescence is more tardy and more apt to be interrupted. Cases treated by salicin seem to convalesce and pick up more quickly than those treated by salicylic acid or salicylate of soda. Other of the salicyl compounds besides salicin and salicylic acid are available and may be of service, and of these salicylous acid is the most important. This remedy, is the *oleum spireæ*, obtained from the *Spiræa ulmaria*, our meadow-sweet. It is a slightly coloured mobile liquid. Taken alone or dissolved in spirit it has a hot pungent taste, and, like salicylic acid, it causes some irritation of the throat when swallowed. The oil is contained in the flowers of the plant. (*The Lancet*, June 21, 1879.)

**The Cure of Hæmorrhoids.**—Prof. Andrews of Chicago publishes the further results of his investigations of the secret remedy for piles, which has of late been so largely employed in America. The original method consists in exposing the piles to view and smearing the anus with an ointment to prevent smarting in case any fluid should chance to drop. The operator then

takes a sharp-pointed hypodermic syringe charged with a carbolised liquid, and slowly throws a few drops into one of the piles. The pipe is left in the puncture a few moments to prevent the liquid from running out, and to allow it to become fixed in the tissue. The pile turns white and in the most successful cases withers away, without pain, suppuration, or sloughing. Only one pile at a time is treated, and about a week is allowed between the sessions till all are cured. This method seldom fails to cure the disease, it is said, but it is liable to occasion serious accidents. In only seven cases out of a total of 3,300 has death occurred, however, and this when the remedy was made use of in the most reckless and ignorant manner. Such a result tends, therefore, to show that the injection method is as safe as any other, so far as life is concerned. The same relative immunity appears respecting hæmorrhage. Dr. Andrews believes that if the following rules be observed, this method of treatment by hypodermic injection will be less painful than any other, and equally safe. In the first place inject only internal piles, using diluted forms of the remedy at first and stronger ones only when these fail. Secondly, treat one pile at a time, allowing an interval of from four to ten days to elapse between each operation. Thirdly, inject from one to six drops, having smeared the membranes with cosmolin to guard against dripping. Inject very slowly, and keep the pipe in place a few moments to allow the fluid to become fixed in the tissues. Lastly, confine the patient to bed the first day, and also subsequently if any severe symptoms appear. Prohibit any but very moderate exercise during the treatment. (*The Chicago Med. Jour. and Examiner*, Vol. xxxviii., No. 5, May, 1879.)

**Chloral as an Anæsthetic for Children.**—M. Bouchut says that he has administered chloral to more than 10,000 patients without meeting with any accident. It seems as if children could take chloral with much less danger than adults, and tolerate it for a long time; *e.g.* children suffering from chorea have often taken from 100-120 grams of chloral in a month: 1, 2, 3, grams or more given by the mouth will, according to the age of the patient, produce complete anaesthesia lasting from three to six hours. (For children under seven years the highest dose ought to be 3 grams, and for infants between two and five years, 2 grams.) The entire dose must be given at once in 100 grams of a very sweet vehicle. Administered in the form of an enema, or of suppositories, the result will be the same as when given by the mouth. The anaesthesia is complete an hour after the drug has been administered, and a great number of surgical operations, such as extraction of teeth, thoracentesis, opening of abscesses &c. may then be safely

performed. (*Paris Méd.*, August, 1878, *London Medical Record*, June 15, 1879.)

**Conchinin as an Antipyretic.**—Dr. Strumpell has treated fifty cases of intermittent fever, enteric fever, pneumonia, erysipelas, puerperal fever, and phthisis, with this drug, which has been strongly recommended by Wunderlich, von Böck, and Ziemssen, in malarial, intermittent, and typhoid fevers. He gives the results of his treatment in the *Allgemeine medicin. Central Zeitung* for May 14th. Conchinin was given in seventeen cases of enteric fever, where the cold water treatment was not applicable. The patients were, if possible, bathed during the day, and at night if the temperature were high, they took one or two grams (fifteen or thirty grains) of conchinin with diluted sulphuric acid and peppermint-water. The fever decreased during the following eight to twelve hours, and at the same time there was a moderate decrease in the frequency of the pulse. Typhoid fever patients vomited, as a rule, from fifteen to thirty minutes after taking the medicine: this however did not interfere with its effects, because it had already been absorbed. In a few cases, the patients complained of singing in the ears. Given in the form of an enema, it did not produce satisfactory results. In twenty cases of intermittent fever, conchinin acted in the same way as quinine. A gram and a half or two grams were given in a convenient vehicle from six to twelve hours before the time when the attack was expected, and the same dose, or perhaps a smaller one, shortly before the attack. Later on, half a gram to one gram of conchinin was given for several days in the form of pills or capsules; and this treatment was in every case attended by the best results. Conchinin has proved equally efficient in erysipelas and croupous pneumonia, but it has little or no effect on the remittent or intermittent hectic fever often met with in phthisis. (*The British Med. Journ.*, June 21, 1879.)

## Extracts from British and Foreign Journals.

**Treatment of Inflammation of the Middle Ear in Scarlatina.**—Dr. Miles believes that too little attention is paid to aural complications in scarlatina. He affirms that the ears should receive a daily examination during an attack of scarlatina, just as the urine should be examined for casts and albumin. For the treatment of acute disease he recommends, in cases of catarrhal inflammation, the instillation of hot water continuously until the pain is relieved, after which the application is only to be repeated at intervals of half an hour for five minutes. A saturated solution of chlorate of potash may also be directed into the throat. In acute suppuration of the middle ear paracentesis of both drum membranes, through Shrapnell's membrane, may be performed to relieve the pain by discharging the pus; the after treatment consisting in cleansing the ears daily by means of warm water injections, followed by Pollitzer's method of inflation, and the instillation of nitrate of silver, two hundred and fifty grains to the ounce of water. In acute catarrhal inflammation, also, the abstraction of blood from the tragus by means of leeches probably yields better results than any other antiphlogistic means, though warm water may be used to a great extent as a substitute in cases where the leeches cannot be obtained. For this purpose the applications should be frequent and long-continued, and as warm as can be comfortably borne. (*The American Practitioner*, February, 1879.)

**Anæsthesia produced by the Inhalation of Iodoform.**—A gentleman, aged twenty-five, was attended for suspected ulceration of the urethra, and a gram of finely-powdered iodoform was prescribed that he might make a local application. On the following day, towards evening, as he had not been seen since the previous night, his friends determined to enter his room. They did so, and then found him extended upon his bed in a deep sleep. As he did not answer to repeated shouts he was well shaken, and was at length aroused. The patient was unable to account for his abnormal sleep, and it was known that he had not committed any excess on the previous day. Two

hours after awakening, and after a copious repast, his clothes and breath still smelt strongly of iodoform, the box containing which had been found on his bed with the powder scattered about. No ill effects, with the exception of a slight giddiness, were experienced. The case is interesting from the fact that so small a quantity as a single gram of iodoform, and that only in small part absorbed by the mucous membrane of the respiratory tract, should have provoked so complete an anæsthesia for twenty-four hours. During the whole of this time, too, the air in the room was being constantly renewed, since one of the windows was partially open. Experiments made upon a variety of animals in regard to the inhalation of iodoform have hitherto shown that it only produces a transient anæsthesia, with symptoms which recall those produced by protoxide of nitrogen, and in no case a deep and persistent sleep. (*Le Praticien*, March 17, 1879.)

Two somewhat similar cases are reported in the *Lancet* for May 31st. The maximum dose was .8 gram daily in a pill, and the symptoms resulting were those of poisoning, and not of mere anæsthesia. The cases were two in number, and were published by Oberlander. The symptoms of poisoning occurred in one case (a woman of twenty-six years of age) after forty-two grams of iodoform had been taken in eighty days; in the other case (a woman sixty-nine years of age) after five grams had been taken in the course of seven days. The symptoms produced were giddiness, vomiting, and deep sleep, from which the patient could be roused with difficulty. This somnolence was interrupted by periods of excitement, each lasting several hours, and was followed by delirium, intense headache, sense of impending death, spasmodic contractions of the facial muscles, and, in the case of the younger patient, diplopia. The functions of the other sensory organs were not disturbed, and the pupils presented a normal reaction. Deep inspirations alternated with apnoea of about half a minute's duration. After five or six days the toxic symptoms gradually lessened and passed away.

**Weiss on the Use of Pilocarpinum Muriatricum in Children's Diseases.**—The author (*Pest. Med. Chir. Presse*, 1879) has had the opportunity of observing the effects of pilocarpin in fourteen cases where the patients were suffering from nephritis, complicated with general dropsy, following scarlatina. In four cases there existed extensive bronchitis, in two diphtheria, and in one pneumonia of the left side of the lung. In each of these cases the results produced by pilocarpin were most favourable, and the patients could all be dismissed as cured. One of the most important properties of

pilocarpin is that it prevents the dropsy from increasing, keeping it stationary without implicating the kidneys, till the latter have recovered their power of secreting urine more abundantly. Two different kinds of solutions were used for the hypodermic injections: a one per cent. solution for children under four years, and a two per cent. one for children above four years. In such young patients, where collapse seemed to threaten from prolonged illness and great weakness, four or five drops of ether were added to the solution of pilocarpin in the syringe. The author observed that whenever he used this mixture the young patients did not present the phenomena which generally followed the injection of a solution of pure pilocarpin, viz., vomiting, nausea, hiccough, pallor, and a feeble pulse. The injections were made once daily in the upper arm, beginning with half a syringe-ful, and rising to a whole one. The effects of pilocarpin generally appeared after a few minutes, beginning with a slight flush on the face, which, however, gradually increased, and only disappeared when the perspiration had ceased. The latter set in after three to five minutes, beginning on the forehead and face, and gradually spreading over the rest of the body. The duration of the perspiration was different; in one case it lasted for one and a half hours, in another three and a half hours; in a third case, of very considerable universal dropsy, where the amount of urine passed in the twenty-four hours was only 150 c.c. the secretion lasted for fifteen hours, after which the cedematous infiltration decreased considerably. The quantity of fluid secreted in the saliva and the perspiration were in direct proportion to the amount of pilocarpin which had been injected, and to the strength of the solution. Thus a two per cent. solution always called forth a more considerable secretion of perspiration and saliva than a one per cent. solution. Two out of the fourteen patients complained of pains in the abdomen after the injection, and four of headache. In eight cases the pupil was seen to contract; the contraction began at the same time at which perspiration set in, and lasted from thirty to forty-five minutes. The temperature was taken in every case both before and after the injection, and in several of them was observed to fall rapidly after the injection; this decrease, however, never lasted longer than from half an hour to three hours, after which time the normal temperature was again reached. Only in one case, where the perspiration had lasted for sixteen hours, the temperature, which had been  $40^{\circ}4$  C. before the injection, fell to  $38^{\circ}6$  thirty-five seconds after it, and did not rise again. The pulsations of the radial artery increased in a minute from 12 to 30; the pulse was full and jerking; this acceleration lasted from fifteen to thirty minutes, after which time the pulse

vomited. The vomited matter consisted mostly of mucus. After the injection almost all the children coughed very much. In four cases, where there was extensive bronchitis, and in a fifth, which had been showing symptoms of œdema of the lungs and uræmia, the lungs were entirely cleared from the secretion which had accumulated in them by the frequent coughing within forty eight hours. In nine cases there was a strong desire to micturate immediately after the injection, and in three to evacuate the bowels. The motions were thin and very offensive, and were passed in great quantity. In a case of constipation, which had lasted four days, the bowels were moved copiously immediately after the injection. There was no notable increase in the quantity of urine passed after pilocarpin had been injected; it was of a much lighter colour than before. The following are the author's conclusions:— (1) Pilocarpin has proved to be a very successful remedy for children who suffer from nephritis and scarlatina; (2) In giving it to children care should be taken to begin at first with small doses, which may later on be gradually increased; (3) If the little patients are very weak, and are likely to collapse after the injection, a few drops of ether should be added to the pilocarpin solution; (4) The drug produces a very copious and lasting secretion of sweat, such as no other drug has ever been known to call forth—it acts quickly; (5) In cases of bronchitis complicated by dropsy, which often produces dyspnoea in children, the affection of the bronchi vanishes very soon after the remedy has been administered. (*Medical Record*, May 15, 1879.)

**Sodium Benzoate.**—Prof. Klebs, of Prague, announces that the benzoate of soda is the best antiseptic in all infectious diseases. It may be taken in large doses with impunity, and acts, so far as the author's experiments upon animals show, as a more powerful disinfecting agent than quinine or salicylate of soda. The experiments were conducted upon animals inoculated with diphtheria and tubercle, and the benzoate of soda was injected hypodermically. Prof. Klebs, reasoning from the results obtained with rabbits, argues that in a man weighing fifty kilograms a daily dose of 30—50 grams of benzoate of soda would render the poison of diphtheria inoperative. Such large quantities, however, do not appear to be absolutely necessary, as the infection can be successfully combated in men by the administration of much smaller amounts. Thus 25 grams per diem may be given with good results, though the more ordinary dose is 10—15 grams in the same time. The mean of these amounts is probably the best. The drug may be mixed with twice its weight of *Elæo. sacch. menthæ*, 6—15 grams of the powder being given for a dose dissolved in half a wineglassful of

water. Sodium benzoate is prepared by dissolving crystallised benzoic acid in water, neutralising at a slight heat with a solution of caustic soda, drying and then allowing the solution to crystallise over sulphuric acid under a bell-glass. (*Der Practische Arzt.*, Jan. 1879.)

**On the Duration of the Life of the Fœtus in Utero after the Death of the Mother.**—This question has been carefully considered by C. Garezky in his inaugural dissertation, St. Petersburg, 1878. He has collected 379 cases, in which the cesarean operation was performed after death. 308 infants were extracted dead, 37 showed signs of life, 34 were born alive; but of these only five remained alive for some time. The author then gives a sketch of Breslau's experiments on animals, and sums up his conclusions as follows. (1.) The fetus undoubtedly survives the sudden death of the mother. (2.) If it can be extracted in the course of the first six minutes it may be born alive. (3.) Six to ten minutes after the death of the mother the child may still be alive, though slightly asphyxiated. (4.) Ten to twenty-six minutes after death, the infant is highly asphyxiated. (5.) In a great many instances the infants are either highly asphyxiated or dead after the first minute. (6.) The shorter the time between the cause of the death of the mother and the cessation of the heart-beats, the longer the fetus remains alive. (7.) If the mother's death has been caused by some quickly-acting poison the chances for the life of the child are greater than when it has been brought on by some other cause. (*The British Med. Journ.*, June 14, 1879.)

**Treatment of Erysipelas by Injections of Carbolic Acid.**—Dr. Hueter contributes the experience of the Greifswald Hospital to this question. A solution of carbolic acid and water is injected by the Pravaz syringe into the affected skin at points sufficiently near to each other to control the inflammation. In many cases two or three injections are sufficient; in severe ones five are generally found to suffice; whilst in the worst as many as twelve have been used. After making them the skin is kept covered with a carbolized compress which is changed two or three times a day. If the erysipelas is accompanied by lymphangitis and lymphadenitis, mercurial ointment is spread thickly along the course of the red streaks and over the swollen glands. (Abstract in *Archives of Dermatology*, January, 1879, from *Berliner Klinische Wochenschrift*, June 17, 1878.)

**Boracic Acid in Skin Diseases.**—Neumann has found this remedy efficacious in pityriasis versicolor, herpes tonsurans, pruritus cutaneus, urticaria, and eczema. He used the alcoholic solution previously employed by Nyström and Gahr, consisting

of boracic acid, one part; alcohol, thirty parts; sufficient glycerin to dissolve the acid, and a few drops of clove oil. The solution was applied with a brush. He also employed an ointment with paraffin, wax, and oil, and another to which glycerin was added. The salve was spread on linen and found especially useful in eczema. (Copied from abstract in *Archives of Dermatology* for April, 1879.)

**The Treatment of Naso-Pharyngeal Catarrh.**—Dr. Duncan believes that cleanliness is of the utmost importance in the treatment of naso-pharyngeal catarrh. He therefore recommends the free use of Dobell's solution (acid carbol.  $\zeta$ iss. sodii biborat. sodii bicarb.  $\text{āā}$ ij. glycerin f.  $\zeta$ ij. aqua ad f. Oij. M.) with the atomiser, nasal douche, or post pharyngeal syringe. If the nostril cannot be cleared by this means, as often occurs in syphilis, loosen the crusts with a probe, and remove them with long slender forceps. Application of medicines adapted to the case, in the form of spray, powder, or solution, should then be made. In simple catarrh the inflammation may be reduced by the use of astringents such as sulphate of zinc gr. xv—aq.  $\zeta$ j. If the catarrh be of long standing ferric alum, chlorate of potash, nitrate of silver, tannin, and chloride of zinc may be used alternately. When pain lasting longer than half an hour follows the use of the astringent, a spray of U.S. solution of morphia may be employed. In cases in which there is hypertrophy, caustics may be applied with a probe, one end of which is tightly wrapped with cotton. In the atrophic form of the disease the secretion is absent, and astringents must be avoided, as it is necessary to stimulate the glands. A spray from a weak solution of iodine gtt. v—x to aq.  $\zeta$ j. or tr. sanguinaris  $\zeta$ j. to aq.  $\zeta$ j. may be used. Sang., myrrh, and lycopodium in powder, blown into the nostrils, are valuable stimulants. Simple ozæna is treated by carefully removing the pellicle every few days, and then using an astringent spray: after which iodoform blown into the nostrils in powder is effective. The iodoform is not annoying to the patient, and if care be taken to avoid spilling any of it on the clothing, it will not be very disagreeable to others. (*The New York Med. Record*, Jan. 25, 1879.)

**Bromide of Potassium the Cause of Otitis, externa circumscripta.**—Dr. Green in his article upon the recent progress in Otology notices that Grüber calls attention to the observations of Neumann on the eruption produced by bromide of potassium. This observer states that it is closely allied to acne simplex, that it appears on the shoulders, chest, face, and forehead, in the form of papules and pustules, and is sometimes accompanied by fever: that the eruption generally appears in the hair follicles, and that the secretion consists of pus and smegma. Professor

Grüber then relates two cases which had come under his own observation, in both of which there were a number of furuncles in the meatus; both patients were taking the bromide of potassium, and both showed the characteristic eruption on the forehead. In the first case the furuncles recurred with great obstinacy, until the bromide was given up, when there was no further relapse; the second case was seen but once. Both cases Grüber regarded as otitis externa circumscripta, produced by the internal administration of bromide of potassium. (*The Boston Med. and Surg. Journ.*, Jan. 9, 1879.)

**On the Condition of the Eye in Sleep and Disease.**—The eyes have during sleep a position of equilibrium with a parallel drawn in the direction of the axis of vision; in going to sleep, however, they roll, or if disturbed during sleep by raising the lids, they converge upwards. Swinging and diverging movements of the eyeballs are only to be observed in adults during an abnormally deep sleep, and they are therefore to be regarded as proofs of a soporific condition. The pupils during a quiet and deep sleep contract to the size of a pin's head, but every stimulus which lessens the depth of the sleep without causing awakening, leads to a dilatation of the pupil, which occurs rapidly, but only slowly diminishes if the sleep is continued. The conditions are the same in the narcosis of chloroform and in the sleep produced by chloral; the deeper the soporific condition, however, with contracted pupils, the less is their reaction to a stimulus, and in the deepest stages the pupils may wholly fail to react to any stimulus. The cornea during sleep is covered with a viscid fluid, and the conjunctiva is slightly injected. This phenomenon is according to Dr. Sander dependent upon the sleeping condition of the brain, which causes an alteration in the secretion. In addition to these symptoms, the upper lid falls during sleep, the space between the lids becomes smaller, the eyeball is retracted, and loses something of its tension. If it be concluded that in the waking state the pupil dilates when it is covered by the eyelid, whilst it is seen that they contract during sleep in spite of this fact, the phenomenon can only be explained, according to Dr. Sander, by supposing that a stimulus acts during sleep upon the central nervous system. Although a satisfactory explanation of these facts is still required, we must at present be contented with the supposition that the state of the psychic organ has a direct and immediate effect upon certain appearances noticed in the eyeball. The condition of the eyes in pathological states is then considered. In the eyes of the dying whose skin is often covered with a clammy sweat, there is a lustreless look. The same loss of brilliancy is to be observed in patients suffering from acute

delirium, in whom the saliva is viscid and is present in large quantities. So long as the pupils remain dilated the brain is not to be looked upon as in a condition of sleep, at any rate so far as the pupils are concerned. In nervous diseases the differences in the pupil are chiefly observed in paralytics, but it is often difficult to decide whether the affected side is that on which the pupil is contracted or not. One often sees during the waking condition that upon the same side as the pupil is contracted there is a narrowing of the interval between the lids; but quite a different relation is observed during the sleep of such patients. Occasionally no difference in the pupils is observed, or they contract during sleep very slightly or not at all; whilst pupils which are dilated during the waking state continue to be so during sleep, the pupil of the opposite side contracting as usual. A difference occurred during sleep in two cases of paralysis, which was not observable during the waking state. It is finally interesting to observe that the pupils in patients affected with paralysis diverge more frequently from the normal during sleep, than they show variations from the contraction which usually occurs from accommodation, convergence, or the influence of light. (*Arch. f. Psych.* ix. p. 129, *Centralblatt f. die Med. Wiss.*, April 26, 1879.)

#### **Œdematous Laryngitis Cured by Iodide of Ethyl.—**

Dr. Capitan records a case of cedema of the glottis which occurred in the course of a pulmonary disease after catching cold. All the dangerous symptoms of suffocation, dyspnoea, and pain in swallowing, occurred, but were successfully combated in a few days by the inhalation of ethyl iodide. (*Ann. des malad. de l'oreille du Larynx, &c.*, No. 3, 1878; *Centralblatt f. die Med. Wiss.*, May 3, 1879.)

**Inhalation of Bromine Vapour in Croup.**—Dr. Jaeger, of Ragaz, Switzerland, recommends the following treatment for croup. From half to one teaspoonful of Schuetz's solution of bromine (iodide of bromine, bromide of potassium,  $\bar{a}\bar{a}$  30-50 centigrams; water, 150 grams), is to be poured on a sponge in a proper receptacle, and the vapour inspired at intervals of half an hour or an hour. At the same time the neck may be covered with ice compresses. The author also employed this treatment advantageously in a case of croupous bronchitis occurring in a lady twenty-nine years of age. (*Schweiz. Cor. Bl.*; *The New York Med. Journ.*, 1879.)

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## Department of Public Health.

### THE SANITARY COMMISSIONER OF INDIA ON THE PREVAILING DOCTRINES AS TO THE CAUSES OF CHOLERA IN THEIR RELATION TO SANITARY IMPROVEMENTS.

BY T. R. LEWIS, M.D.

THE Annual Reports of Dr. J. M. Cuningham, the Imperial Sanitary Commissioner of India, have for several years maintained a place in the foremost rank in English and Continental Sanitary literature. As the one just issued—the fourteenth—summarises to a certain extent the doctrines which have been advocated in his previous reports, excerpts from some of the more salient portions of the volume will doubtless be welcome to our readers, especially as the original volumes are available to but a very limited number of them. We shall confine our extracts to sections of the Report dealing with cholera.

Referring to the prevailing view that the course taken by the disease bears a relation to the high roads and railways of the country, Dr. Cuningham states that the cholera-history of the year under review (1877) coincides with previous experience, namely, that "*cholera in India in these days of railways and steamboats travels no quicker than it did when there were no railways and no steamboats and hardly any roads.*" The italics are in the original. In no instance could the Sanitary Commissioner satisfy himself that an outbreak of the disease occurred through "importation;" and with regard to the supposition that attendants on the sick are proportionately more liable to be attacked than others living in the same neighbourhood, Dr. Cuningham compares the facts with the theory in this wise:—

"According to a prevailing theory, a single case of cholera introduced into a community may communicate the disease to the neighbours or to those who may have ordinary every-day communication with the house or person of the sick man, and may thus form a centre of contagion from which an epidemic may

arise destructive to thousands. This is the theory. The fact is, that during 1876 and 1877, in this presidency, 422 cases of cholera were treated in 101 hospitals, 1,301 attendants came into immediate, and many of them into almost constant, contact with them for days, and yet out of these 1,301 persons, only 18 suffered from any symptoms of cholera. In 85 out of the 101 hospitals concerned none of them suffered at all. The only attacks which can in any way be connected with the 1,301 cases of cholera are 18—16 of cholera and 2 of severe diarrhoea.

“Moreover, in none of the 18 instances in which attendants suffered is there evidence to show that the attack was even probably due to contact with the sick. The whole evidence as given in the medical officers’ reports is extracted in Appendix D. The details necessary for forming an opinion on the point, it will be seen, are generally wanting, but in several of the cases, from an examination of dates and other circumstances, there is good reason to conclude that the attack was in no way due to attendance; at Banda, for example, the only three cases in the 20th Madras Native Infantry occurred in the same hut, and the second was attacked within five hours of the first. The mere fact that an attendant is attacked is no evidence that he was attacked because he was an attendant. In some reports the two are conjoined in the relation of cause and effect, just as if there could be no question on the subject, as if the fact of being in attendance on a cholera patient ought actually to protect a person from the influences producing the disease in others, and virtually confer on him immunity from attack. This fallacy was pointed out in the Annual Report for 1872, but it is still very frequently repeated.

“In order to prove that cases of cholera among attendants are due to contagion, it must be shown that the attendants suffered in larger proportion than others. In limited outbreaks the materials may not suffice for any general conclusions, but the facts should be carefully recorded, so that they may be of use when collected as a whole. In the case of any attendant attacked it should be stated how long he has been in attendance; the nature of the attendance; the date of attack; how far this date corresponded with the time when the outbreak was at its height, for this is an important point in the evidence, as tending

to show whether the disease should be attributed to causes general to the community, or particular to the individual; how far the results ascribed to attendance may be due to locality, and how far the attendants, as regards locality, movements, &c., were treated differently from others. The period of supposed incubation is important. It will be observed that in one of the instances it was believed to have been ninety-four hours, and in another twenty-one days.

“As has been pointed out in former reports, the freedom of attendants on cholera cases from any special risk is not to be explained by disinfectants, even if the efficacy of disinfectants were undoubted. Every one acquainted with the habits of natives knows how little care they take in their use, and how little value they attach to them. The facts of 1876 and 1877 merely repeat in a definite form what has been long observed in this country. Knowledge of these facts may do much to calm the minds of people in cholera times. At present many approach a case of cholera with the greatest dread, and attend on it as if they were undertaking the most dangerous duty. If they were to realise that it has been proved by experience that there is absolutely no danger whatever in such attendance, much good would be done not only in quieting needless fears, but also in impressing the important truth that the measures which are best calculated to prevent cholera are not isolation and disinfection of the sick, or the ‘stamping out’ of the disease, as it is popularly called, but the removal or remedying of all local insanitary conditions.”

Following this analysis of the evidence which the material at his command furnished, as to the influence of contagion in disseminating cholera, Dr. Cuninghame proceeds to submit the water theory of the origin and promulgation of the disease to trenchant criticism, the nature of which will be best ascertained by again quoting from the Report:—“Comparatively few persons now believe that cholera is propagated by direct contact with previous cases; but it is still held by many that the discharges of the sick contain a specific poison, which acts indirectly through the water supply. This water theory of cholera, as it is called, is interpreted in different senses. By some it is regarded merely as the means of explaining the special violence of certain out-

breaks. By others it is held to have a much wider application, and is believed to account for the epidemic diffusion of the disease. In regard to the former view, all that need be said is that no instance has been adduced in India to which it seems applicable. Innumerable outbreaks have been connected with the use of impure water; but not only has no specific germ been proved to exist in the water, but the idea seems opposed to the facts of the case.

" This water theory was discussed at some length in the Report for 1872.<sup>1</sup> It was then pointed out that it seemed irreconcilable, *first*, with the geographical distribution of the disease in this country—with the existence of well-marked and extensive tracts of country which escaped, and the existence of other well-marked and extensive tracts which suffered severely, there being no material difference in the water-supply of these exempted as compared with the epidemic areas; *secondly*, with the experience of the same areas in different years, some of which were marked by almost total absence of cholera, and others by violent epidemics, there being no material difference in the water-supply of one year as compared with another: *thirdly*, with the history of individual stations, some of which suffer frequently severely from cholera, while others, where the water is just as liable to contamination, generally escape, or, if they do suffer, suffer to a trifling extent; *fourthly*, with the experience of bodies of men moving into camp on account of cholera, and using an entirely different water from that which had been in use when the disease attacked them in cantonments, and yet with the change there was no abatement of the disease, even when there had been ample time for all effects derived from the cantonment water to disappear; *fifthly*, with the almost simultaneous appearance of the disease among various bodies of men in the same place, but drinking water drawn from many different sources; *sixthly*, with the general similarity in the rise and fall and disappearance of the disease among these different bodies of men; *seventhly*, with the fact that the pollution of the water-supply is least likely to occur at the commencement of an outbreak when the cases are fewest, and that the outbreak begins to decline just when the cases are most numerous, and

<sup>1</sup> Pp. 20 to 25.

the risks of pollution greatest; *eighthly*, with the general character of different epidemics, some of which are distinguished by great force, not only in the extent of country which they cover, but also in the severity with which they affect the individual places attacked; in one epidemic the different sections of the community, such as the various bodies of men in a cantonment, all suffer much, in another they all suffer comparatively little, the sources of water-supply being numerous and of the same character in both epidemics. It seemed hardly possible that the virulence of the supposed poison could vary in different years, or that the quantity could have been so apportioned to the different sources as to produce such results.

"The experience of the years since 1872 has fully confirmed these views. The history of the non-epidemic year 1874, as compared with the epidemic year 1875, is particularly striking. In Oudh, for example, in 1874 there were only 68 deaths from cholera, in 1875 there were 23,321; in the Punjab 78 in 1874, 6,246 in 1875; in the Central Provinces 14 in 1874, and 14,643 in 1875; in Berar 2 in 1874, and 22,465 in 1875, and so on with other provinces, as may be seen in the table given in the first paragraph of this section. According to this theory, in 1875 the water was generally polluted with cholera discharges; in 1874 it was not. In other words, a cholera epidemic over an area of many thousands of square miles was dependent on a series of accidents occurring in neighbouring districts about the same time, while in 1874 these accidents were as rare as they had been frequent in 1875. The enormous differences between these two years are not to be explained by mere accident. Even if it had been shown beyond all manner of doubt that cholera is due to a specific poison, and that this poison resides in the evacuations, it would require very strong proof before the accidental pollution of the water-supply over enormous areas could be accepted as the explanation of an epidemic year; for even in a non-epidemic year there is no want of cholera cases amply sufficient to contaminate the water. But as the very existence of the cholera germ has itself still to be established, as well as the opinion that it resides in the discharges, not only is the chain of argument imperfect, but every important link in it seems to be wanting.

"The question receives, perhaps, even more definite and striking illustration from the statistics of villages attacked in 1876 and 1877, as given in Appendix B, especially if they be taken in conjunction with those of 1875. The variation in the figures for these years is often very remarkable, as may be seen from the following examples, which might be multiplied so as to include very many districts:—

DISTRICT	Number of Villages in District	NUMBER OF VILLAGES ATTACKED AND NUMBER OF DEATHS REGISTERED FROM CHOLERA					
		1875		1876		1877	
		Villages	Deaths	Villages	Deaths	Villages	Deaths
Ranchee .	7,464	170	1,472	431	3,885	15	52
Chyhabassa .	3,179	108	172	62	143	16	33
Allahabad .	3,183	*	1,383	433	1,935	4	253
Unao .	1,682	460	1,605	*	1,428	3	5
Hardui .	1,980	365	2,973	*	32	2	5
Bareilly .	3,082	*	730	304	3,111	10	33
Lahore .	1,710	28	288	130	722	4	5
Rawalpindi .	1,717	1	1	142	626	1	1
Saugor .	1,873	3	20	213	2,975	65	344
Nainsinghpur .	971	19	93	289	4,192	7	28
Akola .	1,108	708	7,847	33	233	62	394

\* No information.

"Villages vary much in size and in means of water-supply. Often there are many wells; in other cases the people depend on a stream. It is very much under-stating the case to take one source of water-supply for each; but even on this most inadequate basis of calculation it would follow, according to the water theory, that while in Ranchee, in 1875, 170 sources of supply were polluted by cholera discharges, and 431 in 1876, the number so polluted in 1877 was only 15; that in the neighbouring district of Ranchée similar preponderance of such accidents took place in these two first years, and that in the third they were here also similarly rare. Or, to take Bareilly in 1876, 304 such accidents occurred, but in 1877 there were only 10; and so on with the others."

"Setting aside scientific inquiry altogether, the mere doctrine of chances altogether forbids the acceptance of any such explanation. As regards water drawn from streams, there is in addition

another great fact which seems as fatal to the water-theory as the great fact already stated is fatal to the theory of human intercourse. *Cholera almost invariably travels, not down, but up the great drainage channels of the country.* There is no such thing on record as an epidemic commencing in the Upper Provinces and working its way, for example, down the valley of the Ganges or the valley of the Indus. The progress is always in exactly the contrary direction.

"The vast importance of pure water can hardly be exaggerated. This has been urged again and again in these Office Reports during the last ten years. The evil of the water theory is, not that it insists on this requisite, but that it does not insist on it on a sufficiently wide and logical basis. As regards cholera, the only danger in the water-supply, according to this theory, is the danger of its containing cholera discharges. Other impurities may exist in abundance, but without the supposed germ there can be no outbreak. But this view of the case is insufficient, especially as it is based on purely theoretical considerations. The only sound sanitary principle in regard to water is, that it must be free not only from cholera discharges, but from every form of impurity. Pure water is a most important preservative of health, not only against cholera, but against all diseases. On this point the following remarks from Dr Payne's *Annual Health Report on Calcutta* for 1877 may be quoted with advantage:—

'The doctrine known as the *water theory* did not hold good, for it demanded a germ from a cholera-stricken person to produce the change; and the whole history of the season was opposed to such specific origin. It is necessary also to anticipate objection by pointing out that there were probably other media besides foul water wherein the poison might be created, that disease often appeared where foul water could not be found, and foul water frequently failed to cause immediate disease. All these precautions were taken, and they left the main propositions unimpaired, as an argument of commanding force for leaving no means untried to get rid of filthy water. In my first report I alluded to some facts which had occurred in the native lunatic asylum as strongly suggestive of a close relation between filthy water and fatal dysentery. The experience of the year 1876, striking as it was in this respect, did not justify a positive conclusion. It was followed in 1877 by events which rendered such a conclusion inevitable. The dysentery which had from the earliest times been the great scourge of the place, and had yielded to no efforts of sanitation, now disappeared. The fatal cases, which had always been numerous in former years, were in 1877 represented by a single death. The surreptitious conveyance of filthy water to the mouth was discovered in the middle of 1876, and prevented. No other changes took place to explain the disappearance of disease.'

Along with a better water-supply it may be mentioned that the lunatics were relieved of the overcrowding from which the asylum had suffered so much in former years.

“The water theory errs in demanding a remedy for only one out of many sanitary defects. But cholera is to be dealt with on the same general principle as all other diseases, and this is, that every sanitary defect must be sought out, and, as far as possible, remedied. The cause of cholera—what governs its distribution, and its relative incidence in different places—is still as inscrutable as when the disease first appeared; but it is well known that when this cause or combination of causes is present, it is favoured by filth, overcrowding, and every other condition adverse to health. The practical work to be done is to remedy these conditions.

“Theories of contagion, whether direct or indirect, form no safe basis for State interference in sanitary affairs. The action they involve is either already as well or more fully provided for on sound sanitary principles, as has just been illustrated in the case of cholera and water, or it is altogether impracticable, like quarantine, which has been in former years attended with great discomfort and oppression to the people, and with no good result. Even isolation and disinfection, which are prescribed in hospitals, and can be productive of no harm in them, if pressed on the people, can be productive only of mischief, for such interference worries and annoys them in their domestic relations, it tends to make all sanitary measures unpopular, and it diverts their attention from the only real work to be done—sanitary improvements. Quarantine, isolation, and disinfection have utterly failed to prevent or arrest outbreaks among European troops in cantonments, even when carried out under the most careful superintendence. To ask the people over the enormous area of India to rely on such measures for protection, is to ask them to rely on what has been tried within the limited area and population of a station and found ineffectual. Even if isolation and disinfection had been attended with decided benefit in the case of troops and jails, it would be altogether a mistake to order their adoption by the people at large, for the people have often no means of carrying them out. Any machinery directed to enforce such an order must be most costly, and, in spite of its costli-

ness, must be most inefficient, productive of much social misery, and powerless to effect any good. The removal from the affected locality has proved of signal service in the case of troops and prisoners, but this measure also, although founded on no theory of contagion, is one which, however much it may be recommended, can never be ordered by the Government. Practically, then, State legislation in this matter is limited to urging on sanitary improvements apart from all theories. It may be argued that the stoppage of pilgrimages has proved beneficial, and that this can be explained only on the theory of contagion. But no such explanation is needed. The stoppage of pilgrimages in time of cholera means the stoppage of filth at fairs, of overcrowding, of fatigue, exposure, and privation—all most insanitary conditions.

"In the Report for 1872 the truth of the general principles here advocated was illustrated by the marked diminution of cholera in the Madras jails since they had been placed in a better sanitary condition; a similar illustration may now be given for Bengal. In his report, as has been already mentioned in Section IV., Dr. Bryden has tabulated most complete statistics of the jails of each local government and administration in this Presidency since 1859. The results are shown in two nine-year periods, and they are as follows. They have already been tabulated in the section on jails, but this section, which deals with cholera, would be incomplete without them:—

Province.	Year.	Cholera mortality.	Total mortality including cholera.
Bengal Proper ... ..	1859—67	19·40 per 1,000	90·30
	1868—76	7·85 "	51·45
Oudh ... ..	1859—67	7·40 "	83·50
	1868—76	·82 "	21·68
North-Western Provinces	1859—67	7·59 "	72·52
	1868—76	1·45 "	36·34
Central Provinces ... ..	1859—67	11·27 "	63·78
	1868—76	2·73 "	38·95
Punjab ... ..	1859—67	2·19 "	46·46
	1868—76	·82 "	32·94
Total for Bengal ... ..	1859—67	10·77 "	73·45
	1868—76	3·28 "	38·68

"These figures are very striking. The mortality from cholera has been reduced to a small part of what it was, and this cannot be explained by measures taken against contagion, for—and this is perhaps the most gratifying feature in the case—the marked diminution in cholera has been attended with a marked reduction in other diseases also. The total mortality from all causes in the jails of the Bengal Presidency from 1868–76 was little more than one-half what it had been in the nine years previous. The practical and most important inference is that the general sanitary measures which reduce other diseases also effect a marked reduction in cholera."

The portion of the section of the Report dealing with cholera is brought to a conclusion with an extract from the recently promulgated Government of India Regulations, which are to be enforced in future on the outbreak of cholera in India. The rules hitherto in force were amended in accordance with the recommendation of a Special Committee, which had been assembled under the orders of Government towards the end of 1876, to report on the whole question of quarantine as a means of protecting cantonments from the disease. The amended rule cited bears the heading—"Officers in Command not to establish Quarantine," and it runs thus:—

"It must be distinctly understood that commanding officers are not authorised to establish or enforce against the public at large, or any section thereof, any quarantine, or any restrictions in the nature of quarantine, as against cholera in particular, which are not equally applicable at all times to the control of vagrant classes of people having no legitimate ground for claiming admission within cantonment limits. The employment of the troops to form cordons round cantonments for such purposes is strictly prohibited, discipline in this, as in other matters, being enforced by the ordinary means placed at the commanding officer's disposal for such purposes, and it is to be carried out without additional expense to the State beyond that authorised by these rules."

## ILLUSTRATIONS OF THE ARREST OF INFECTIOUS DISEASES BY ISOLATION OF THE SICK.

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In the *Practitioner* for October, 1878, I gave some illustrations of the arrest of small-pox by isolation of the sick. I am now able to illustrate the subject of this paper further by giving my experience of the treatment of an outbreak of scarlatina by isolation of the sick in a tent hospital.

From June to the middle of August, 1878, there was very considerable prevalence of that disease in the town of Grantham and some surrounding parts.<sup>1</sup> It appeared likely to become a serious epidemic if unchecked, especially as there had been a fair immunity from the disease during the preceding four years; consequently I recommended the sanitary authorities to combine in providing a temporary hospital of tents for the purpose of isolating the cases.

A meeting of representatives of the three urban authorities was held on June 24th, when the proposition was agreed to by the Grantham and Little Gonerby representatives. The Spittlegate sanitary authority agreed to it at a meeting held the next day.

On June 27th the Rural sanitary authority of Grantham were asked to join, and they agreed to make provision for a part of their district.

<sup>1</sup> It may make the following description clearer if I state that the town of Grantham comprises three Urban sanitary districts, viz.:—

	Population estimated at the middle of 1878.
Municipal Borough of Grantham . . . .	5,650
Local Board District of Spittlegate . . . .	6,392
Local Board District of Little Gonerby . . . .	3,031

Whilst Harrowby and New Somerby, containing perhaps 800 or 900 inhabitants, also form a part of it. An Act has just been obtained for extending the municipal borough so as to include all these parts.

An elevated site was chosen in a grass field just outside the town in Little Gonerby, 300 or 400 yards from the nearest house. To begin with two hospital marquees were purchased. They were ordered on the evening of June 25th, arrived from London in the evening of June 27th, and were pitched on June 28th. A small tent for the male attendant and another which served as a mortuary were put up, and also one for convalescents to sit under, as there was no shade from trees in the field.

A wooden building was erected which was divided into a washhouse, kitchen, nurses' room, store-room and dispensary, and a room for female attendants to sleep in. A separate structure was made for earth-closets, the contents of the pails being trenched into the ground every day. A drain was made for the disposal of slops by sub-irrigation of the grass land through common tile pipes.

The order for the wooden buildings was given on June 27th, they were commenced on June 28th, and six patients were got into one of the marquees in the evening of Sunday, June 30th. The floor of the other marquee was finished the next day, and then that also was occupied.

No provision was made for heating the tents, as the weather was too warm to need it. Buckets were kept constantly filled with water in all of them for immediate use in case of fire.

The nurses slept in them, as so many of the patients were young children requiring constant attention.

No water could be obtained in the field, but there is a good spring three fields off. The labour of fetching it all from there was, however, too great, so it had to be led in a cart from the town every day.

It was found necessary to provide more accommodation, so on July 2nd it was decided to purchase a third marquee; but as I found one could not be supplied before July 8th, I obtained the loan, for £1 each, of the tents belonging to the Newark Urban sanitary authority, which had been used for the isolation of cases of small-pox in 1877.

On July 3rd two marquees arrived from Newark. One was pitched that evening and the other on July 6th, but a floor was not put to the latter till July 15th, after which date it was occupied.

Two Netten-Radcliffe hospital tents arrived from Newark on July 17th. They were pitched that day, and two others on July 22nd.

Another marquee was purchased and arrived from London on August-1st.

The tent accommodation for scarlet fever cases consisted, therefore, of five hospital marquees and four Netten-Radcliffe hospital tents. Three of the former were placed end to end, and two of the latter were pitched in a similar manner. This arrangement was found expedient, as each tent placed separately would have required more supervision than we could command with our staff of nurses and attendants, many of the patients being too young to be left by themselves. When necessary the end walls were let down to divide them into separate compartments.

The tents are made by Messrs. Piggott Bros., of 59, Bishopsgate-street Without. They have double walls, and all the canvas is rendered fireproof.

The marquees are 30 feet long by 16 feet wide and 7 feet high at the sides. They contain 400 superficial and 3,800 cubic feet.

The Netten-Radcliffe hospital tents measure 16 feet by 14 feet, and are 13 feet high at the ridge. They have perpendicular canvas walls 3 feet 6 inches high on the two sides. They contain 224 superficial and 1,850 cubic feet.

All of them have ample provision for ventilation.

I prefer the Radcliffe tents, since they are firmer and more easy to manage when erected.

All of them were trenched round; the floors, which were made at Grantham and Newark, were raised from the ground.

The wooden building was also trenched round; it has a raised boarded floor to all parts except the washhouse, and is of the following internal dimensions:—

Height at sides . . . .	7 ft.
Height at ridge . . . .	12 ft.
Washhouse . . . . .	12 ft. 6 in. by 12 ft.
Kitchen . . . . .	12 ft. 6 in. by 12 ft. 10 in.
Nurses' room . . . . .	6 ft. by 12 ft. 10 in.
Store-room and dispensary	3 ft. 4 in. by 12 ft. 10 in.
Female attendants' room .	9 ft. by 12 ft. 10 in.

The walls are made of  $\frac{3}{4}$ -inch boarding, placed vertically with "cloaked" joints. This was found to be sufficiently warm during the hot weather. The roof is boarded and covered with tarred felt, protected openings being made at the ridge for ventilation.

In the washhouse there is a copper and second cooking-grate, and in the kitchen a No. 7 "Mistress" American cooking-range, with a boiler. It measures 3 feet 1 inch from side to side, and is set with a brick chimney. This is a very useful range and well adapted for the purpose.

The tents were furnished with iron bedsteads and cots. The mattresses, bolsters, and pillows were stuffed with chopped straw. This was emptied out and burnt when they were finished with, the covers being steeped in a disinfecting fluid ready to be refilled and used again at any time. All articles of clothing that could bear it were steeped in a disinfecting fluid before being returned from the hospital. The need of a disinfecting apparatus for other articles was greatly felt, and we were obliged to trust to exposing them to the air for disinfection.

An old cab was purchased for removing the patients in, a horse being hired when required. Mr. Eaton, one of the medical men residing in the town, was engaged to attend the patients. Two trained nurses from Lincoln, one male and three female attendants were employed. The mothers of two or three infants who were admitted with them were also engaged to help.

In all sixty-six patients, varying in age from 18 months to 38 years, were treated in the tents, as is shown by the following table:—

Date of Admission.	Sex.	Age.	Residence.	Result.	Date of Discharge.
June 30	Female	12	Russell Court, Grantham	Cured	July 14
do.	Female	18m.	do. do.	do.	July 21
do.	Male	5	do. do.	do.	Aug. 24
do.	Male	9	Queen St., Spittlegate	do.	July 21
do.	Male	4	Rutland St., Grantham	do.	Sept. 14
do.	Male	7	Vere Court, Little Gonerby	do.	Aug. 10
July 1	Male	9	Wharf Road, Spittlegate	do.	July 21
do.	Female	6	do. do.	do.	do.
July 3	Male	14	Vere Court, Little Gonerby	do.	Aug. 10
do.	Female	9	Bluegate, Grantham	do.	Aug. 24
do.	Female	4	Great Gonerby	do.	Aug. 10
July 4	Female	7	do.	do.	July 21

Date of Admission.	Sex.	Age.	Residence.	Result.	Date of Discharge.
July 5	Female	28	Lincoln (Nurse)	Cured	Aug. 17
July 6	Male	5	Vere Court, Little Gonerby	do.	Aug. 10
do.	Female	5	Grantley St., Spittlegate	do.	do.
July 7	Male	3	Bluegate, Grantham	Died	July 27
do.	Female	2	do.	Cured	Aug. 3
July 12	Female	12	Rycroft St., Spittlegate	do.	Aug. 17
July 13	Male	5	Albert St., Spittlegate	do.	do.
July 15	Male	6	Spittlegate Hill	do.	do.
do.	Male	9	Norton St., Spittlegate	Died	Aug. 19
July 16	Female	10	Rycroft St., Spittlegate	Cured	Aug. 17
do.	Female	28	The Barracks, Harrowby	do.	do.
do.	Female	4	do. do.	do.	do.
do.	Male	2	do. do.	do.	do.
July 18	Female	2	Grantley St., Spittlegate	do.	Aug. 3
do.	Female	9	{ South's Yard, Welby St., } { Grantham }	do.	Aug. 17
do.	Female	2	do. do.	do.	do.
July 19	Male	10	Brewery Hill, Spittlegate	do.	Aug. 24
do.	Male	7	Welby St., Grantham	do.	Sept. 14
July 20	Male	9	Rutland St., Grantham	do.	Aug. 24
do.	Female	8	do. do.	do.	do.
do.	Female	11	Blue Dog Yard, Grantham	do.	Aug. 10
do.	Male	6	Rutland St., Grantham	Died	July 21
July 23	Male	10	Welby St., Grantham	Cured	Aug. 24
do.	Male	12	do. do.	do.	do.
July 24	Female	8	Bluegate, Grantham	do.	do.
do.	Female	5	do. do.	do.	do.
do.	Male	6	Honington	do.	Aug. 25
July 25	Female	15	The Barracks, Harrowby	do.	Aug. 24
July 26	Male	5	Stanton St., Grantham	do.	Aug. 31
July 28	Female	12	New Somerby	do.	Aug. 24
do.	Female	2½	Great Gonerby	do.	Sept. 14
do.	Female	6	do.	do.	Aug. 31
July 30	Female	2½	do.	do.	Sept. 14
do.	Female	7	Welby St., Grantham	do.	Sept. 7
do.	Female	6	New Somerby	Died	Aug. 3
Aug. 1	Female	19	Normanton	Cured	Sept. 12
do.	Female	9	Honington	do.	Aug. 25
Aug. 2	Male	6	Great Gonerby	do.	Aug. 31
do.	Male	8	do.	do.	do.
do.	Male	3	do.	Died	Aug. 24
Aug. 4	Female	26	Hill Foot, Great Gonerby	Cured	do.
do.	Male	10	Great Gonerby	do.	Aug. 31
do.	Male	7	do.	do.	do.
do.	Female	5	Welby St., Grantham	do.	Sept. 7
Aug. 5	Male	9	Wong Row, Little Gonerby	do.	Aug. 31
Aug. 8	Female	10	Harrow St., Spittlegate	do.	Sept. 7
Aug. 9	Male	4	Inner St., Spittlegate	do.	do.
Aug. 10	Female	28	James St., Little Gonerby	do.	do.
Aug. 12	Male	38	The Barracks, Harrowby	do.	Aug. 31
Aug. 13	Female	17	do. do.	do.	Sept. 7
do.	Female	5	Inner St., Spittlegate	Died	Aug. 19
do.	Female	12	Blue Dog Yard, Grantham	Cured	Aug. 31
Aug. 18	Female	16	Malt Hill, Little Gonerby	do.	Sept. 14
?	Female	?	Hospital Tents (Nurse)	do.	do.

The following table shows the number of patients admitted from the several districts, the number of houses they came from, and the number that died in hospital:—

Name of District.	Number of Patients.	Number of Houses admitted from.	Deaths.
Grantham Urban Sanitary District . .	22	12	2
Spittlegate Urban Sanitary District . .	14	11	2
Little Gonerby Urban Sanitary District .	8*	4	0
Grantham Rural Sanitary District . .	22	13	2
Total . . . . .	66	40	6

It will be seen that 9·09 per cent., or one in eleven of the cases, ended fatally.

The weekly state of the number of patients is shown in the next table, but it indicates a total of only 65 patients, as I do not know the date on which one of the nurses was put on the sick list.

Week ending on Fridays.	Remaining from previous week.	Admitted.	Discharged.	Died.	Remaining in Hospital.
June 30 to					
July 5	—	13	0	0	13
July 12	13	5	0	0	18
July 19	18	12	1	0	29
July 26	29	11	5	1	34
Aug. 2	34	11	3	1	41
Aug. 9	41	7	0	1	47
Aug. 16	47	5	5	0	47
Aug. 23	47	1	10	2	36
Aug. 30	36	0	14	1	21
Sept 6	21	0	9	0	12
Sept. 14 (Saturday) }	12	0	12	0	0

No patients were admitted after August 18th. The tents were cleared out on September 14th, after having been occupied just eleven weeks.

\* This number includes two of the nurses. One was taken ill the day after she arrived, and therefore probably came with the disease upon her; the other was so slightly affected that she continued to discharge her duties the whole of the time.

On August 1st they were visited by Mr. Netten-Radcliffe, one of the inspectors of the medical department of the Local Government Board, and on August 23rd by Mr. Dashwood, one of the general inspectors.

Many presents of books, toys, fruit, flowers, &c., were kindly sent for the use of the patients, which added much to their comfort, and were greatly appreciated by them.

On July 19th I found a boy, aged five, ill with scarlatina at a house in Welby Street, Grantham. He was lying on some chairs in a small room, without any fireplace, window, or other means of ventilation, which was in direct communication, through an open doorway, with a greengrocer's shop. I saw several customers, mostly young children, go in and make purchases. The woman mangles clothes in the same room, and I found a bundle ready to be sent away. The father, mother, and boy slept in a small bedroom, and four children slept in another small one above it. The house was very stuffy, the odour of overcrowded rooms pervaded it.

The parents refused to allow the boy to be removed to the tents. It was most important that he should be got away, since the conditions under which he was placed were almost certain to spread the infection of the disease broadcast over that locality, and thence to other parts of the town. I accordingly at once gave a certificate, under Section 124, Public Health Act, 1875, to one of the Borough Magistrates, that the boy was suffering from a dangerous infectious disorder, and was without proper lodging or accommodation. He accompanied me to the house, and was about to make an order for his removal when the parents at last gave way, and he was forthwith taken to the tents.

In the meanwhile I found that the bundle of clean clothes, mentioned above, had disappeared. I ascertained the house they had been sent to, and had them all steeped in a disinfecting fluid.

The woman was afterwards summoned under Section 126, Public Health Act, 1875. She was fined one shilling and twelve shillings costs by the Borough Magistrates, a heavy penalty not having been pressed for, as the summons was taken out chiefly for the sake of making the public more

cautious by causing it to be generally known that any one is liable to be prosecuted who exposes, without previous disinfection, any articles which have been exposed to the infection of any dangerous infectious disorder.

The cost of the hospital was divided in the ratio of the populations of the districts from which patients were admitted, which gave the following shares of the total sum for each district:—

Grantham Urban Sanitary District . . . . .	0.32
Spittlegate Urban Sanitary District . . . . .	0.36
Little Gonerby Urban Sanitary District . . . . .	0.18
Grantham Rural Sanitary District . . . . .	0.14
	<hr/> 1.00

The following summary of the expenses shows the amount borne by each district and the total sum:—

Name of District.	Grantham Urban.	Spittlegate Urban.	Little Gonerby Urban.	Grantham Rural.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Rent of Site . . . . .	8 3 0	8 13 2	1 15 7	1 7 6	10 0 0
Buildings, Tents, &c. . . . .	87 12 5	98 11 5	49 5 9	38 6 8	273 16 8
Fittings and Furniture . . . . .	52 9 5	59 0 8	29 10 4	22 19 2	163 19 7
Other Expenses <sup>1</sup> . . . . .	112 14 2	126 15 11	63 7 11	49 6 2	352 4 2
Total . . . . .	255 10 9	288 1 2	143 19 7	111 19 6	800 0 0

On July 31st a woman, who was beginning to be ill with small-pox, was sent from a house in Regent Street, London, where she was cook, to her aunt who kept a small dairy at Boothby Pagnall, about six miles from Grantham, in the Rural Sanitary District. Her medical attendant informed me of the circumstance on August 2nd, and I saw her with him on August 3rd. She was in a very small bedroom, the only one in the house, which had no fireplace, and but one window, only half of which would open. It was occupied by five persons, one of them being an infant a year old, which had never been vaccinated until after the arrival of the woman, when the

<sup>1</sup> This item may not be exactly correct, as one or two of the accounts included in it are not quite settled yet.

nature of the disease had been made known. The other three occupants had been previously successfully re-vaccinated. The woman herself had been vaccinated in infancy, but never since. I could only detect one mark on her arms. She suffered from very bad confluent small-pox.

Milk and butter were being supplied from this house, but, acting on my advice, the occupier carefully abstained from doing so until it was free from infection.

There was no chance of isolating the patient in the village. I applied for her to be admitted to the workhouse hospital, and to the fever wards at the Grantham hospital, but the request was refused, so I recommended that the Netten-Radcliffe hospital tent, which had been used for a similar purpose in the preceding year, at Ruskington, should be hired from the sanitary authority of that district and be put up in the field at Little Gonerby, adjoining the one in which the hospital tents were then placed for the reception of scarlatina patients.

This was done on Aug. 3rd, the tent being pitched about 120 yards from the others in such a position that the prevailing wind blew from it clear of them. The woman was removed into it on the same day, under the supervision of the sanitary inspector, in the fly which had been purchased for the removal of fever patients. This was thoroughly disinfected before being used again, and subsequently the infected house at Boothby. The patient's own medical man attended her, and a woman from Grantham was engaged to sleep in the tent and nurse her. The latter was re-vaccinated before she was allowed to enter upon her duties, but it did not take, as she had previously had small-pox.

Provisions were supplied from the kitchen at the hospital tents, but it was strictly ordered that there should be no communication between the two places by means of the attendants. A bell was placed mid-way between them; when anything was required attention was called by this means, whatever was wanted being deposited in the open air by the male attendant of the hospital tents and conveyed thence to the other tent by the nurse. All crockery was washed in a disinfecting fluid before it was returned.

The patient died on Aug. 11th, and was buried the same day, a quantity of a disinfectant having been placed in the coffin.

The nurse was sent back to Grantham on Aug. 13th, in an entirely fresh suit of clothes; those belonging to her and the patient, and the beds were burnt. We insisted on the inmates of her house being re-vaccinated before her return home.

The isolation of this case had the effect of entirely preventing the spread of the disease at Boothby.

Very considerable expense had been gone to in organising the arrangements for isolating the scarlet fever cases, so this appeared to be the only manner in which the case could be dealt with, as we should not have been warranted in incurring the additional expense of an entirely fresh establishment.

From personal inquiries I made in London of the medical man who had seen the woman at the commencement of her illness, I ascertained that it could not be proved for certain that her employer was aware of the nature of her disease, so I did not consider it practicable to institute proceedings against him.

When the woman died the male attendant at the fever tents went into the small-pox tent, and shortly afterwards, against strict orders to the contrary, entered one of the former. On Aug. 23rd, a girl who had been in it, but who had returned home to Spittlegate on Aug. 17th, was ill with the disease in a very modified form. She was at once removed to the fever wards at the Grantham hospital, and was soon convalescent.

The disease was again entirely arrested.

The expenses connected with this tent which amounted to 20*l.* were paid by the rural sanitary authority alone.

That treatment of the cases of scarlet fever in the tents was beneficial to them would appear from the following facts:—

1. That no case of dropsy arose in them, although many of the patients were young children who are frequently liable to be affected in that way after scarlatina.

2. That, on the contrary, several dropsical cases which were sent in recovered.

3. That some very bad cases recovered in them which apparently must have ended fatally if the patients had remained at their own homes.

Since the hospital was of a temporary nature and was not erected until an epidemic threatened, it may be premised that the disease had become pretty general before it was ready for

occupation, hence it is somewhat difficult to clearly define the influence which the isolation of the sick exercised over its spread. I am fully convinced, however, that it was effectual in checking it, and in support of this view I can give the following instances in which the early removal of patients from, for the most part, densely populated parts which had become fresh centres of infection, was followed by the entire prevention of the further spread of the disease in the localities named. Moreover, in every instance in which they were taken away from *fresh centres* of infection their removal was followed by complete arrest of the fever.

1. In Grantham Urban Sanitary District :—

A house in Russell Court, a crowded, badly ventilated part, inhabited by a dirty set of people ; a house in South's Yard, a confined place, where infection would have spread very readily ; two houses in Bluegate.

2. In Spittlegate Urban Sanitary District :—

A house in Queen Street ; a house in Wharf Road ; two houses in Rycroft Street ; a house in Albert Street ; a house on Spittlegate-hill ; a house in Chamber's Yard, Norton Street ; a house in a yard in Inner Street ; a temperance hotel in Grantley Street.

3. In Little Gonerby Urban Sanitary District :—

A house in Vere Court, a part inhabited by a dirty set of people, where infection was especially liable to spread ; a house in James Street which is let out in lodgings ; a house in Wong Row ; a house in Malt Hill.

4. In Grantham Rural Sanitary District :—

Two houses at Honington, a village about six miles off ; a house at Normanton, a village between seven and eight miles off ; two adjoining houses at the militia barracks, Harrowby, which are inhabited by a great number of children and grown-up persons who are brought very much into contact with one another.

Eleven patients were admitted from six houses at Great Gonerby. As long as the cases were removed from that village the disease was kept under, but after the tents had been closed on account of the outbreak appearing to have ended and the weather having become too cold for them to be occupied, it broke out again there. We then asked permission for the school, which had been closed, to be used as a temporary hospital, but the

request was not acceded to. There was no other empty building which could be used for the purpose, and then, as we were no longer able to isolate the sick, the disease had to be allowed to go on unchecked. It accordingly spread all over the village and killed ten more persons in a population of about 1,260, one who had been removed into the hospital having died previously. From August to December fourteen cases of scarlatina, with one death, occurred in four houses at Harlaxton in the rural sanitary district. This parish was not included in that portion of the district from which patients were admitted into the tents, consequently none of them were removed, and it will be seen that the infection of the disease lingered about there for four or five months.

Scarlet fever caused five deaths in the town towards the end of the year, namely, one in Grantham on Nov. 3rd, one in Little Gonerby on Nov. 11th, and three in Spittlegate on Dec. 16th, 17th, and 28th; but the disease then showed no signs of becoming epidemic.

That the hospital was not the means of spreading infection in the least degree is evident from the facts that there were no cases of the disease in any of the houses nearest to it, and that there was relatively much less of it in Little Gonerby than in any other part of the town, and this notwithstanding the tents were situated in it and every patient had to be conveyed through it on the way to them.

It would be misleading for me to attempt to give the total number of cases which occurred during the outbreak, as there is no registration of disease, and I am fully aware that they did not all come to my knowledge.

It was seen that those houses in which we knew there had been any were disinfected. The Elementary Schools were kept closed from June 24th to Aug. 26th, the Spittlegate National School having been re-opened a week later than the others. I am satisfied that this was an important factor in curtailing the outbreak.

In the majority of instances parents when asked to send their children to the tent-hospital allowed them to go, but in a few cases they refused. Objections raised at first were several times overcome by inducing them to pay a visit of inspection to the

tents. Here the reputed objections of the commonalty to use hospitals, at least in the case of children, were overcome.

I would remark in conclusion, that infectious disease should not be left to be dealt with by such temporary measures as I have described, for when they are resorted to for arresting its spread it has mostly gained a firm hold on a place, consequently the expenses incurred are much greater than they need be, and the labour devolving upon those engaged in the administration is very considerable. They should not take the place of more permanent provision, but will often form a very useful adjunct to such.

# THE PRACTITIONER.

SEPTEMBER, 1879.

## Original Communications.

### NOTES OF A POST-MORTEM EXAMINATION ON A CASE OF ATHETOSIS.

BY SYDNEY RINGER, M.D.,

*Professor of Medicine at University College, London.*

IN the *Practitioner* for August, 1877, I published the notes of a case of athetosis. The patient, when twenty-eight years of age, was struck down with right-sided hemiplegia, hemianæsthesia, and unilateral sweating. He subsequently recovered the lost power and sensation on the right side, but the unilateral sweating persisted. As he regained his lost power the athetosis developed itself. The patient was re-admitted May 29, 1878. He now suffered severely from his heart; he had orthopnea; his jugulars were full, and his lips and ears livid, his legs were greatly swollen, and his expectoration bloody. His athetosis was much the same as when he left the hospital about a year before. He died June 12. I shall first give a brief account of the examination of his heart and lungs, and then a fuller account of the state of his brain.

The right auricle and ventricle were very greatly enlarged, and the auricle much hypertrophied, its walls being twice their

natural thickness. The tricuspid valves were diseased and partially united at their edges, so as to cause decided tricuspid obstruction. The pulmonary artery contained an old laminated clot occupying a large part of the lumen of the vessel. The left auricle contained a small old clot in the appendix. The mitral valve was much constricted, and would only admit the tip of the forefinger, and the edge of the valve-ring was calcareous. The left ventricle was very slightly hypertrophied. The aortic valves were not quite competent, and showed slight calcareous change. The heart weighed twelve ounces. In both lungs we found pulmonary apoplexies. The walls of the pulmonary artery had undergone considerable atheromatous and calcareous degeneration.

*Brain.*—We could not discover any trace of an occluded vessel.

The pia mater was slightly opaque and cloudy, perhaps rather more on the left than the right side, and especially so anteriorly.

The left hemisphere did not seem at all wasted. There was, perhaps, a little wasting over a very small extent, an inch in diameter, and an inch outside the longitudinal fissure and at the junction of the anterior and middle third. On stripping off the pia mater the convolution of the left side seemed to fall apart a little more than those of the right.

We then made transverse horizontal sections across the brain, and found the brain substance, judging by the naked eye, healthy till we laid bare the lateral ventricles. The parts in the right lateral ventricle looked quite healthy. In the left lateral ventricle there were evident signs of disease affecting the posterior part of the corpus striatum, that portion close to the *tænia semicircularis*, and which lies just outside the anterior portion of the thalamus. This part was depressed and rather hollowed out, and the membrane covering it was thickened. The anterior part of the corpus striatum and the *tænia semicircularis* looked healthy. The left optic thalamus was decidedly smaller and flatter than the right. .

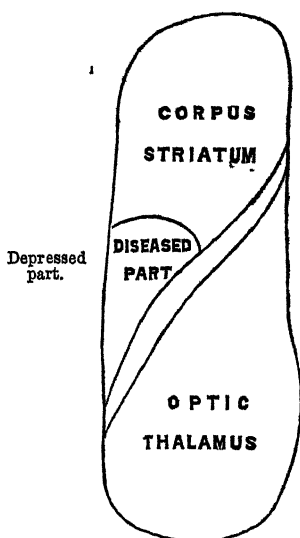
We then exposed the third ventricle and found the anterior and posterior commissures very distinct, but the soft commissure was gone. The optic thalami were now better exposed, and the

diminution of the left was now more apparent, it being perhaps a quarter less than the right, the transverse measurement of the right thalamus being two and a half centimetres, that of the left two centimetres. We then made transverse vertical sections through both corpora striata. The first section was made through the anterior part of the corpora. We found the brain substance beneath the depressed portion of the left corpus much softened, the softening extending a little to the right and left of the depression. The softened tissue was a light yellow colour.

We then made another transverse section a quarter of an inch posterior to the first, and this exposed, on the left side, the anterior part of a cyst situated in the grey matter of the lenticular nucleus, just external to the white matter dividing the caudate from the lenticular nucleus. Further sections showed that this cyst had its long axis in the antero-posterior measurement of the brain and involved the lenticular ganglion, the anterior part of the cyst being mainly, if not exclusively, in the lenticular ganglion, but it extended behind the corpus striatum, lying outside and rather below the left thalamus, the posterior limit of the cyst reaching to one and a half centimetres anterior to the posterior edge of the optic thalamus. The cyst was external to the thalamus, half a centimetre of white matter intervening between the cyst and the grey matter of the thalamus. Thus, posteriorly, the cyst was situated in and surrounded by the left peduncular expansion. Close to the posterior part of the corpus the cyst was only a quarter of a centimetre from the grey matter of one of the convolutions.

The cyst measured transversely one and a half centimetres, and its long measurement was about three centimetres.

The cavity was lined by loose connective tissue containing



serosity, and the tissue around the cavity was tinged a light orange colour.

The cyst, in general terms, lay anteriorly in the corpus striatum, being situated in the lenticular nucleus; behind it lay outside, and rather below the anterior two-thirds of the thalamus, but the posterior portion of the whole left corpus was softened, and the thalamus was wasted.

The parts posterior to the lesion, namely, the crus, the pons, the medulla, the floor of the fourth ventricle, and the spinal cord and nerves, were carefully examined, but no evidence of wasting, or any other change, could be detected by the naked eye.

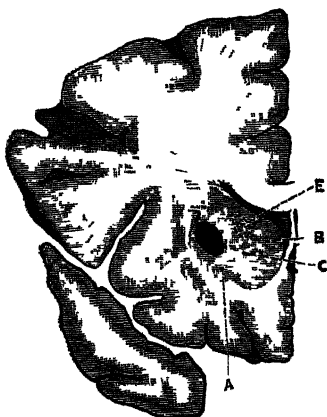
Dr. Ewart kindly took charge of the brain, and has made a careful microscopical examination which I append. He also has given me an account of the situation of the cyst and has kindly made the drawing showing its position. He says "the cyst lies in the posterior half or two-thirds of the lenticular nucleus, the cyst lying in front immediately without the inner capsule, but passing obliquely through the lenticular nucleus. After leaving the posterior part of the lenticular nucleus it involves the whole of the white matter lying outside and rather beneath the optic thalamus, and runs parallel with the left thalamus for about half an inch. A small portion of the grey matter of the optic thalamus adjacent to the cyst is destroyed."

I now give the drawings prepared by Dr. Ewart. The first represents a transverse section through the anterior part of the left corpus striatum, the second through the posterior portion, and the third through the optic thalamus.

*"Microscopic Appearances presented by Transverse Sections through the Structures surrounding the Anterior Third of Cyst.*—The most striking appearance presented by sections through the anterior end of cyst was the projection into its interior of fibres derived in part from the inner capsule (Fig. 1, c), but chiefly from the lenticular nucleus (Fig. 1, A). A few of the fibres extended in a straight line for 2—3 m.m. towards the centre, but the greater number formed an irregular network, supported by the empty blood-vessels, immediately within the cyst. In the meshes of this network were nerve-cells, blood-corpuscles and pigment masses. On the inner side many of the

fibres were traceable to the inner capsule, some passing towards the surface, others towards the spinal-cord. At the lower and outer side the fibres were more delicate, and many of them from

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their connection with small round and oval nuclei were connective tissue-fibres, whilst others from their connection with large nerve-cells were evidently nerve-fibres. Other fibres passing from the peduncular expansion either entered to end in the cyst or passing along its outer side communicated with cells from which processes entered the cyst. The greater number of

the fibres radiating from the cyst were lost sight of in the substance of the lenticular nucleus. Lying on and between the nerve- and connective tissue-fibres were many small round and oval nuclei, a few blood-corpuscles, and in several sections large oval (in transverse section round) sacs packed full of red blood-corpuscles. These sacs had probably resulted from the reflux of blood from the surrounding healthy substance into thin and unsupported veins. They were never found at the side of the cyst next the inner capsule. The arteries were empty and served as a supporting framework for connective tissue and nerve-fibres which had escaped the softening process; the nuclei in the walls of the vessels were very distinct but apparently healthy."

"To pass now to the ganglionic nerve-cells, and first those lying isolated or in groups amongst the fibres lining the cyst. A number of them looked quite healthy and had either long or short processes in connection with them, some of which passed to cells lying in the substance of the nucleus. From such cells in which the only visible change was a slightly granular condition of the nucleus to those of which scarcely anything but a coarsely granular nucleus was left, every possible gradation existed, the amount of degeneration being in ratio to the distance from the healthy structures. While the first appearance of atrophy seems to be a granular condition of the nucleus, the protoplasm around the nucleus seems first to undergo complete disintegration. Many of the cells adjacent to the cyst, and from which processes passed to its interior, had so atrophied that they would in all probability be functionally useless, but the cells external to these had large bright nuclei and nucleoli, and the processes passing to and from them were larger than usual. This apparent hypertrophy of the cells and fibres connected with them may be accounted for by supposing that besides their own work, they had done at least part of the work of the cells and fibres which had been destroyed."

"*Sections through the Middle Third of the Cyst* (Fig. 2) presented similar appearances, but on account of its lying deeper in the substance of the ganglion its relation to the inner capsule and the peduncular expansion was less apparent. The nerve-cells were similar to those already described, but less numerous, and the degenerative changes penetrated further into the centre

of the ganglion. Numerous small bundles of nerve-fibres ended abruptly in the cyst and were surrounded with connective tissue-fibres and cells, blood-corpuscles, and pigment."

"*Sections through the Posterior Third of the Cyst* (Fig. 3) were especially interesting, for at this part the cyst had all but left the lenticular nucleus to involve the outer and lower surface of the optic thalamus and the fibres of the outer capsule lying between it and the claustrum."

"Numerous very delicate nerve-fibres extended into the cyst from the thalamus, and along with them, as before, connective tissue-fibres and blood-vessels. There were no widely dilated veins, but many isolated red blood-corpuscles. The nerve-cells in the irregular lining of the cyst as well as those in the substance of the thalamus were less distinct than in the other sections, and it was almost impossible to make out their relation to the healthy and partly-destroyed fibres. The fibres on the outer side of the cyst, however, were apparent enough, and the ruptured and degenerated fibres passing from it were traceable for some distance in both directions. From two to four millimetres of the grey substance of the thalamus round the cyst had lost its normal appearance, many granules were present, the fibres were indistinct, and the cells faintly granular."

"*Changes in the Caudate Nucleus.*—Near the inner capsule and parallel to the depression on the surface of the caudate nucleus already mentioned a tract of grey matter was found in which atrophic changes had evidently set in. The intercellular substance had partly disappeared, the cells almost obscured by free blood-corpuscles, and granules were lying near each other, and the fibres passing to and from them were evidently in an unhealthy state. The above changes only existed in the part of the caudate nucleus corresponding in extent to the anterior fourth of the cyst; their position is indicated at E, Fig. 1."

"The fibres and cells of the claustrum and of the other parts of the left hemisphere near the basal ganglia and on the surface were normal in appearance."

"No change could be detected in the spinal-cord, and there was only doubtful evidence of slight atrophic changes in a few of the fibres of the anterior pyramid in sections below the locus niger."

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From the above it will be evident that a few of the motor fibres (inner capsule) passing between the lenticular and caudate nucleus and a greater number of the sensory fibres (outer capsule) passing from the filament were destroyed; that about one-sixth of the grey matter of the lenticular nucleus and a small portion of the lower and outer part of the optic thalamus was also completely destroyed, and a portion of what remained of these nuclei and of the caudate nucleus partly atrophied, and further that the fibres passing to and radiating from the destroyed grey matter would be rendered inactive.

The disease in this case therefore appears to have been limited to the optic thalamus, corpus striatum, and the parts just external. The whole of the corpus striatum was much damaged, both the intra- and extra-ventricular portions (caudate and lenticular nuclei). Beside much atrophy and slight degeneration of the intra-ventricular portion, about one-fifth of the lenticular ganglion was destroyed and was occupied by the anterior part of the cyst. A few of the fibres (inner capsule) passing between the nuclei of the corpus striatum were destroyed. The corpus striatum was the part which suffered most, but the left optic thalamus was also wasted, and a small portion of the lower and outer portion of this body was completely destroyed, whilst a considerable portion of the white matter external to the thalamus (sensory fibres of the outer capsule passing from the filament) was destroyed, and the part occupied by the posterior part of the cyst. It thus appears that the diagnosis made when the man first came under my care is (in the main) correct.

In the account published in the *Practitioner* (August, 1877), I said, "Dazzling before the eyes, dimness of sight, giddiness preceding loss of consciousness, and followed by loss of speech, and sensation and motion of the right side, point conclusively to the left hemisphere of the cerebrum as the seat of the disease. The giddiness indicates the mesencephalon, the loss of speech, the posterior part of the third frontal convolution, the loss of sensation, the thalamus opticus, and the loss of motion the corpus striatum, as the parts probably affected. As speech returned before sensation and sensation before voluntary motion, the main stress of the disease must have fallen on the

corpus striatum and in a less degree on the thalamus. It is probable, I think, that the cause of the attack was an embolon set free from the diseased mitral valves blocking the middle cerebral artery."

It will conduce to the better understanding of this interesting case if I here introduce an account given me by Dr. Ewart of the probable course of the nerve fibres.

A considerable number, about one-fourth, of the fibres pass from the crus cerebri to the cortex without being in connection with the cells of the thalamus and corpus, some of the fibres passing outside these bodies.

The motor fibres running along the crusta radiate to all parts of the cerebrum to the frontal, parietal, occipital, and sphenoidal lobes, but especially to the frontal and parietal. One set of fibres passes directly to the occipital and temporal lobes, and another passes between the caudate and lenticular nuclei to the parietal and frontal lobes without any connection with the grey matter of the corpus. The remaining fibres of the crus pass into the grey matter of the corpus and terminate in the cells, and this part is in connection with the fibres which pass to the frontal and parietal lobes, and the apex of the temporal and to the insula. The olivary fasciculus from the anterior column, the fasciculi teretes from the lateral column, and fibres from the posterior pyramid, unite to form the tegmentum from which fibres pass to the corpora quadrigemina, corpora geniculata, and optic thalamus, and proceed from the thalamus to form part of the peduncular expansion and pass to the occipital parietal and temporo-sphenoidal convolutions and the insula. Other fibres undoubtedly pass directly to the cortex.

The consideration of this case naturally falls into two parts :—

1. The period of paralysis.
2. The period of athetosis.

It is interesting to observe that this man recovered completely from paralysis, both of motion and of sensation, although a large hole tunnelled through a most important part of his brain remained, and the tissue around it, especially that composing the left basic ganglia, continued considerably damaged. A not inconsiderable and a highly important part of the left cortex

was therefore permanently cut off from the body and yet no paralysis remained. No doubt both in effusion of blood and in embolism much brain substance around the effused clot or around the tissue deprived of its blood, becomes affected by pressure, serous effusion, &c., and as the pressure is removed, the paralysis due to these causes subside. But in this case a serious lesion destroying a large extent of brain persisted, and yet the patient recovered completely from his paralysis. How is this to be explained? The broken communication by means of the cyst between the cortex and the rest of the body could be re-established in two ways: by vicarious function, parts of the brain taking on function formerly performed by other portions of the brain; or new channels for the passage of the nerve current arrested by the cyst might be formed around it.

This case does not enable me to say which of these views is correct, but I may suggest if the restoration of lost power was due to vicarious function, then that part of the cortex cut off by the cyst and no longer exercised should waste, but we could not distinctly detect any wasting of the convolutions.

I may point out that the lesion was situated in the usual seat in cases of hemianæsthesia and unilateral sweating, that is in the internal capsule outside and just below the thalamus opticus.

This case teaches us much regarding the seat and nature of the change in athetosis.

It is obvious that the cavity in the brain could not be the immediate cause of the incoordinated and involuntary movement of athetosis, for this breach of continuity of the brain could only cause paralysis. The athetosis therefore must be attributed to the damaged tissues in the neighbourhood of this cavity, and must in this case be due to the damage in the optic thalamus, or the corpus striatum, or both.

These are the structures in which one would naturally expect to find the lesions. Dr. Hammond in his original communication suggested the grey matter of the optic thalamus or the corpus striatum as the probable seat of disease.

As regards the nature of the disease, this case shows that it is due to atrophy and degeneration of the basal ganglia.

How does this atrophy and degeneration produce the move-

ments occurring in athetosis? Dr. Gowers in his paper published in the *Medico-Chirurgical Transactions* for 1876, says:—"The slow irregular spasm which occurs on movement is clearly due in part to a diversion of the motor impulse along an unintended path, or its irradiation over a wider region than that to which it should have been confined." "The symptoms point clearly to damage to the grey matter of the brain, to local perverted nutrition of nerve-cells, in consequence of which they over-act either spontaneously or on the stimulus of the volitional impulse which is by their over-action perverted or irregularly distributed."

I beg to add the views I suggested in my previous account of this interesting case:—

The disease in this man does not imply destruction of function, there being no paralysis, but rather a perversion of function.

In this case we have the following four circumstances to consider:

1. There is, when awake, continuous evolution of force.
2. Incoördinate action.
3. Excessive evolution of force from normal stimuli of will, emotion, and reflex irritation.
4. This evolution of force is produced by stimuli which normally ought not at all to affect this part of the nervous system.

The most striking symptom is incoördinated action. Any stimulus originating either in the will or in the emotional centres no longer calls forth a definite and coordinated act, but on many occasions, and always, after a time, an utterly purposeless act. Yet it is something more than a mere incoördination; for assuming that for every complex combination of muscular contraction there is a coordinating centre, the disease does not consist merely of a destruction or weakening of some of these centres, for then we should get only irregular (incoördinated) action of the muscles set in motion by the voluntary act, but in addition to these many other muscles become powerfully affected; muscles even in the limb not set in motion by the will. Thus the stimulus, whether voluntary or emotional, does not run along definite channels, but radiates in all directions throughout the diseased area of grey matter, producing disorderly movements;

in other words, that force or condition of the nervous centres which restrains the discharge within certain definite areas of the grey matter is weakened, and, owing to this diminished resistance, the stimulus radiates into other parts, producing disorderly and widespread movements.

As in the case of allied spasmodic diseases, as chorea, strange to say, stimuli directed to the diseased nervous tissue not only produce disorderly movements, but impressions directed to a wholly different part find their way to the diseased grey matter, and radiating throughout it, produce disorderly movements. For instance, a voluntary stimulus intended to contract a part of the healthy arm or leg is partly or even wholly diverted to the diseased portion, and sets free in it a nervous discharge instead of in the part it was intended for. In this case emotional stimuli were more diverted by the diseased grey matter than volitional. We may assume that in this case, through some defect in resistance, impressions are not restricted to their proper channels; but at some point where the resistance fails the nervous force leaks out, finding its way to the diseased nervous structures connected with the right arm and leg.

Some eminent writers would, I believe, refer this evolution of force in the diseased nervous centre to higher nutrition reaching an explosive degree; and they would say that in Samson's case an ordinary volitional or emotional stimulus liberated an unusual amount of force, producing very powerful muscular contraction. It appears to me there are cogent objections to this view. We have seen that voluntary movement increases the incoordinated movement, and the longer the voluntary movement continues, the greater the incoordinated becomes, till at last incoordinated completely usurps coordinated movement. Now according to the foregoing theory, the voluntary movement should, so to speak, work off the higher nutrition, and keep it down below an explosive point, and the longer the persistence of the voluntary movement, the more the nutrition (potential force) is consumed, and the incoordinated should give way to coordinated action. On the supposition that the lesion has lessened and in some parts destroyed the resistance, the effect of voluntary and reflex movement is easy to explain. If depressed, then, by voluntary and reflex action it becomes still further

depressed, and hence the impulse can more readily irradiate. The condition is comparable to that of the spinal cord of a frog to which a dose of strychnia, only just sufficient to produce tetanus, has been given. On irritating a limb we produce at first only a coordinated reflex act, but by keeping up the reflex contraction of the leg this at last becomes tetanic. The strychnia has depressed resistance, though not enough to permit the onset of tetanus till resistance itself is still more depressed by the functional activity of the cord. If it is said, How then do you explain the excessive evolution of force, and consequently very powerful muscular contraction?—this I would explain by adducing a fact I have tried experimentally to prove, that the resistance not only localises, but restrains the amount of nervous discharge, and by weakening it we not only allow the irritation to irradiate, but also to set free an excessive amount of force.

Is any of the spasm in Samson's case due to the lesion which produced the loss of resistance? Does the lesion act as an excitor causing a perpetual discharge of force, or is all the spasm due to volitional, emotional, and reflex stimuli? In the early stage of the case, when the movements were violent during sleep, I suggest that the lesion acted as a stimulus, since it is evident that the movements could not be produced during sleep by the will or by the emotions. Latterly, and during the time he has been under our charge, the original lesion appears to play no part in the evolution of force, for the limbs are quiet during sleep. It is true, he tells us, that occasionally his arm or leg moves during sleep to wake him; but after careful watching we have never seen this; therefore it must occur but seldom, and I suggest that it is then due to the emotional excitement of a dream.

It seems to me that athetosis is allied in many diseases, with which at first sight it would appear to have little or no affinity. In athetosis, as we have seen, a change takes place in certain parts of the cerebrum, especially in the basal ganglia (optic thalamus and corpus striatum), whereby a stimulus is not restrained to its normal portion of grey matter, but "radiates" into other parts, so that instead of coordinated we get incoordinated muscular contraction. In addition, stimuli destined for another part of the brain are diverted as it were to the

diseased area; and hence the diseased area becomes excited by stimuli which naturally would exert no action on it. In the case of many other diseases we meet with precisely the same unrestrained action, due to lessening or destruction of the "resistance" in certain portions of the cerebral nervous system, so that impressions radiate beyond their normal sphere. Wherever this irradiation or loss of "resistance" occurs, the change causing it, I venture to assume, is identical, whatever the kind of disease leading to it; being in the present case probably embolism. If this view holds good, it is obvious that athetosis becomes connected with many diseases manifesting symptoms widely different from those pertaining to athetosis itself. If the "loss of resistance," or in other words, the condition permitting "irradiation," is situated in parts connected with motor nerves, we get irregular incoordinated contraction of muscles; if with parts connected with sensory nerves, we get widespread pains. The persistence, remittance, or intermittence of the exciting cause will of course modify the symptoms. Thus if the exciting cause is permanent, then the muscular contraction or pain will be permanent; if remittent, the contraction or pain will be remittent; if intermittent, then also the contraction or pain will be intermittent.

Thus the name athetosis indicates the seat of the disease rather than its nature.

The constant slow movement due to the consecutive slow contraction and relaxation of different muscles can, I think, be explained in this wise: the loss of resistance being partial only, as soon as the evolution of force has reduced the potential force, the remaining resistance is adequate to restrain the irradiation, till nutrition has again restored and accumulated the potential force, when the weakened resistance is unable longer to restrain the evolution of force within normal limits. Contraction and relaxation of various muscles will then occur with consequent constant changes of the affected limb.

The similarity between athetosis and chorea is too evident to be dwelt on; so I will now attempt to show its affinity to diseases with which at first sight it would seem to have no relation. For example, it appears to me to be allied to stammering. In stammering, before the word can be uttered, there

occurs, in mild cases, remittent and alternating spasm of the muscles surrounding the mouth; in more determined stammering almost all the muscles supplied by the seventh nerve are affected; in severe cases the neck muscles produce frequent spasmodical jerking of the head; whilst in very severe cases, in addition to all these muscular movements, there is frequent spasmodic heaving of the shoulders.

On analysing these movements, we find that the impulse, starting from the speech centre, instead of running at once in its proper channels, is diverted, and through loss of resistance radiates through the nucleus of the seventh, the irradiation being in mild cases slight, and involving that part only of the nucleus supplying the muscles surrounding the mouth. In more developed cases, however, irradiation takes place throughout the greater part of the nucleus of the seventh, and in still severer instances involves the grey matter in connection with nerves supplying some of the neck muscles, and reaches even the spinal accessory, causing spasmodic contraction of the trapezius and consequent heaving of the shoulders. As in athetosis, so in stammering, the muscles are not all simultaneously contracted, some being relaxed, whilst others are contracted. This state is not, of course, continuous like athetosis, for the simple reason that the exciting cause, speech, is itself intermittent; but I venture to think that the condition (the loss of resistance) permitting the irradiation is the same, only that it affects different parts, and stammering might therefore be called intermittent athetosis of the facial and other muscles.

I will give an illustrative example in the case of a man belonging to a family of stutterers, himself when young a notable stutterer. After a time the spasmodic movements of the face and of the head ceased, leaving in their stead a spasmodic shrugging of the right shoulder three or four times repeated before he could begin to speak, when the shoulder became quiet. Like ordinary stammering, the convulsion was much more marked, indeed, was almost violent, when he tried to pronounce C and Z. Whilst the shrugging was going on he meanwhile was obviously striving strenuously to get out the word or letter. Here, the defect permitting irradiation, the loss of resistance, at

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first extensive, gradually grew less; but instead of disappearing entirely, as in most cases, a remnant remained, the impulse generated in the act of speech irradiating to the nucleus of the right spinal accessory nerve.

Athetosis is allied also to painful spasmodic affections, as neuralgia. But here the irradiation occurs in a portion of the grey matter associated with sensory nerves. Indeed, in watching over a case of athetosis we were struck with its similarity to a neuralgia. Thus we might compare it to a case of sciatica. In sciatica there is often some persistent pain, and in our case there was some sustained spasm. In sciatica, in addition to the characteristic persistent pain, other pains shoot now through one branch of the nerve, now dart through another. So with athetosis; in addition to the sustained contraction we get likewise now contraction of one set of muscles, and these relaxing, then contraction of another set.

It may be objected that in athetosis the irradiation is comparatively tardy, as shown by the slow continuous movement, whilst in stammering it is far quicker, and in neuralgia is of lightning-like rapidity: and that this difference must imply a difference in the nature of the change permitting the irradiation. To this I may answer that the rapidity of movement varies greatly in athetosis, as shown in the cases reported by Dr. Gowers; in other diseases the rapidity with which the nervous discharge travels varies greatly; thus the aura of epilepsy and the allied aura in other nervous affections, vary much in the rate of passage along the central nervous system, yet we do not therefore assume that the nature of the change in the nervous centres is different in kind.

## A COUNTER-IRRITANT: ITS ACTION.

BY JOHN CHIENE, F.R.C.S.E.,

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AFTER the perusal of an interesting and suggestive paper by Dr. Hart, in the *Practitioner*, November 1878, entitled Sympathetic Pain, my attention was re-directed to the allied subject of Counter-irritation. My object at present is to bring forward an attempt to explain the action of a counter-irritant. An irritant acts either directly on the tissues to which it is applied, or indirectly through the nervous system. The nervous mechanism is a combination of an afferent impulse along the sensory nerves of the part to which the irritant is applied. The sensory nerves are in connection with a vaso-motor centre, in which as a result of the afferent stimulus, a change takes place. The result of this change is an alteration in the condition of the walls of the blood-vessels which are under the command of the vaso-motor centre.

A mustard blister is applied to the skin at s (Fig. 1). An impulse passes along the sensory nerve s N. A change takes place at v M the vaso-motor centre; the result is an efferent impulse along the vaso-motor nerve v M N, the result is a change in the size of the blood-vessel B. Dilatation takes place.

This is the generally allowed explanation of an indirect irritant. A counter-irritant acts also through the nervous system. Let us now suppose that we have an inflammation of the kidney. The blood-vessels of the kidneys are dilated with a slow flow of blood through them. Let the word "congestion" be used for this condition to distinguish it from dilatation of the blood-vessels with a quickened blood-flow. For this condition



which rules the vessels of the kidney. What is the nature of this change in the vaso-motor centre of the kidney? Before considering this let us consider the physiology of a vaso-motor centre. Let me take an illustration from common life. A man is driving a horse. The man may "feel the horse's mouth," the horse may stumble, the man pulls on the reins and supports the horse; the horse may run away, the man loses all command. Let the man be the vaso-motor centre, the horse the blood-vessel.

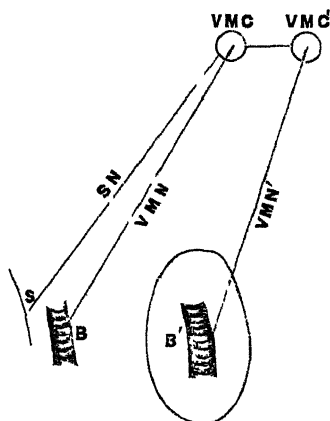


FIG. 2.

When the horse runs away the man has lost all command,—that is the condition in the vaso-motor centre in which the blood-vessels are congested—dilatation with slow flow—the vaso-motor centre has lost command of the blood-vessels. When the horse stumbles and the man pulls it up, that is analogous to that condition in the vaso-motor centre in which the vaso-motor centre is active,—its function is increased when the man feels the horse's mouth, that is analogous to a condition in which the vaso-motor centre is normal.

Let us now consider the conditions in a muscle analogous to these three conditions of the vaso-motor centre. A muscle is inflamed, the blood-vessels of the muscle are congested—dilatation and slow flow; a muscle is contracted as in tetanus—the blood-vessels are dilated with quick-flow determination—a muscle is at rest, there is anæmia relatively to the state of congestion or determination.

To take another example, in the brain. When inflamed there is congestion, dilatation, and slow flow,—in thought, the functions of the brain are active; the blood-vessels of the brain are dilated with quick-flow determination. The brain is at rest as in sleep, the blood-vessels are anæmic.

There are then *three* conditions in an organ, (1st) at rest, normal; (2) its functions increased; (3) its functions abrogated. These three conditions are associated with an alteration in its blood supply. Physiologists tell us that this is true of a muscle and of the brain. May it not also be true of a vaso-motor centre? In it we have the three conditions—the function of the vaso-centre may be normal, the function of the vaso-motor centre may be increased, or it may be lowered. In the first we have relative *anæmia* of the centre; in the second we have *determination* of blood to the centre; in the third we have *congestion* of the centre.

Let us now apply these considerations to the counter-irritant in the case of the inflamed kidney.

When the kidney is inflamed the blood-vessels of the organ are dilated with slow-flow congestion—the vaso-motor centre has lost command of the blood-vessels of the kidney—its function is in abeyance—it is congested. If we now apply a counter-irritant to the skin, as a result through the sensory nerves we have a change in the vaso-motor skin centre with a corresponding change in the blood-vessels of the skin. There is increase in the amount of blood in the vaso-motor centre. There is a flow of blood to the vaso-motor centre, the neighbouring parts are bled, the vaso-motor centre of the kidney is in close anatomical relation to the vaso-motor centre of the skin over it. The kidney vaso-motor centre which is congested is bled, it supplies blood to the skin centre, the result is that the vaso-motor kidney centre gradually regains its function. The kidney vessels, as a consequence of the change in the vaso-motor centre, pass from congestion to determination—a free flow of urine takes place, and from determination to one of relative *anæmia*—the kidney is restored to a normal condition. If this explanation is verified by further investigation and experiment on animals by those who have the power to make such experiments, we shall then be able to throw aside all such terms

as a change in tone, terms which mean nothing. I desire to express my conviction that a change in function of an organ, be it a muscle, the whole brain, or a part of the brain as a vaso-motor centre, must be accompanied by a change in the anatomy of the part. When we remember the temporary nature of the improvement that takes place on the application of a counter-irritant requiring its repetition or continuance in order that the result may be a permanent improvement, I think we must look to alteration in the blood-supply as the most probable anatomical lesion. The organ at issue is so minute that it may be only the blood plasma which bathes it, which may be altered in a moment. The withdrawal of a single minim of blood plasma from a vaso-motor centre may have an effect on that organ equivalent to the withdrawal of a couple of ounces of blood from the biceps muscle.

I have tried to show that when we apply a poultice over the loin in inflammation of the kidney, the good result which follows is in part due to a bleeding of the vaso-motor kidney centre to supply blood to the vaso-motor skin centre, which is in anatomical and physiological connection with the kidney centre. This bleeding at A (Fig. 3) is *microscopic*; the vaso-motor organs at the proximal end of the nervous mechanism are microscopic.

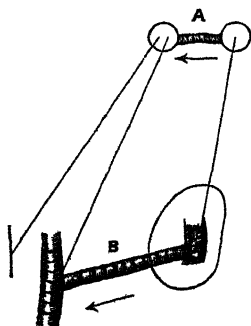


FIG. 3.

The counter-irritant in the case of the kidney acts however in another way. We can inject the skin of the loin through the renal artery, there is a free arterial anastomosis between the blood-vessels of the kidney and the skin over it. The

vessels of the skin are dilated, the blood-vessels of the kidney supply the blood. There is therefore also a *macroscopic* bleeding at B (Fig. 3). The action of the counter-irritant is twofold in the case of the kidney, a *microscopic* bleeding at A, relieving vascular tension indirectly through the nervous mechanism; there is also a *macroscopic* bleeding at B, relieving vascular tension directly.

It may be asked, is it necessary to theorise about the microscopic bleeding at A? will the macroscopic bleeding at B not be sufficient to explain the good result that follows? If we take the lung, when it is in a state of inflammation, a poultice over the chest relieves the condition, and in this case there can be no direct macroscopic bleeding; as there is no direct anastomosis between the lung-vessels and the vessels of the chest-wall, the good result which follows must be due to the microscopic bleeding at A. Indirectly the lung-vessels may be bled to supply the blood to the dilated vessels in the chest-wall, but this must act through the whole mass of blood, and, although it must be taken into account in explaining the good result, still it cannot be the main factor. In the case of the lung the main factor must be at the proximal end of the mechanism, the bleeding must be *microscopic*, the lung centre being bled to supply the skin centre.

The counter-irritant action then is twofold,—in all cases the microscopic bleeding takes place; in some cases the macroscopic bleeding takes place, directly drawing blood, as in the kidney; in other cases the macroscopic bleeding as in the lung may act indirectly through the whole mass of blood in the body. The counter-irritant comes under the class of remedies which relieve or cure inflammation by blood-letting, by relief of vascular tension, directly or indirectly, as the case may be. Counter-irritants may act locally or generally. A blister or a poultice is a local counter-irritant. A diaphoretic, a diuretic, a purgative, is a general counter-irritant. Take the case of a dose of castor-oil; it has been shown when castor-oil is administered that the blood-vessels are dilated in the intestinal mucous membrane. The castor-oil may act as a direct irritant on the vessels, or indirectly through a nervous mechanism, it matters not which; in either case the intestinal vessels are dilated. The blood is drawn from other organs to supply the blood to the intestinal

vessels. So also in the case of the diaphoretic to the skin vessels, and the case of the diuretic to the kidney vessels.

It is not to be forgotten that these remedies will also relieve vascular tension by withdrawing the serum of blood from the mass of blood, in this way still further relieving vascular tension.

Metastasis may be explained in the same way. The parotid is inflamed, its vaso-motor centre is congested, the congestion spreads by continuity to neighbouring parts and implicates the testicle centre.

In conclusion I desire to express my thanks to Dr. Hart for the *idea* which I have now brought forward. If it turns out to be true, then the credit is in great part due to him ; if I have been wrong in my deductions from his generalization, the onus rests entirely with me. Right or wrong, I feel that I have advanced a step in the understanding of the action of one of the most frequent remedies in use in the treatment of inflammation—a remedy the mode of action of which has been, and is perhaps yet, little understood. Our very ignorance regarding the action of a blister, coupled with the frequency with which we use it, makes it one of the most interesting questions which can occupy our attention as thoughtful physicians and surgeons.

# ON THE EFFECT OF SALICYLIC ACID ON THE BODY TEMPERATURE IN HEALTH, WITH SOME REMARKS ON THE TEMPERATURE OF THE URINE.

BY W. NORTH, B.A., UNIVERSITY COLLEGE.

IN the course of some experiments on the elimination of nitrogen made during the summer of last year, I was induced to observe the temperature of the urine and the effect of salicylic acid on the temperature of the body. I propose here simply to state the facts of the experiments and the results obtained.

During these experiments the diet was carefully regulated as to quantity and time of meals, and the urine was passed four times a day at fixed hours. The exact time at which the observations were made is shown in the accompanying tables.

Data.	When taken.	Temperature of Urine F°.	Temperature under Tongue F°.	Remarks.
May 6.	1.55 p.m.	98.4	98.4	After two hours' rest.
	7.15 p.m.	99.3	98.9	
	11.15 p.m.	98.3	98.0	
May 7.	8.0 a.m.	97.3	96.3	After short walk, half a mile.
	2.15 p.m.	99.2	97.7	
	7.0 p.m.	99.6	98.7	
	11.15 p.m.	98.1	97.6	Walk at 8.30.
May 8.	8.0 a.m.	97.1	97.0	
	2.0 p.m.	98.6	97.5	
	7.0 p.m.	98.9	98.5	
	11.30 p.m.	98.4	97.9	
May 9.	8.30 a.m.	97.1	97.1	
	2.0 p.m.	98.1	98.1	
	7.0 p.m.	98.4	98.1	
	11.15 p.m.	98.1	98.1	
May 10.	8.30 a.m.	97.3	97.3	
	2.0 p.m.	98.1	98.1	
	7.0 p.m.	98.3	98.3	
	11.0 a.m.	98.5	98.9	

Date.	When taken.	Temperature of Urine F°.	Temperature under Tongue F°.	Remarks.
May 11.	8.30 a.m.	97.5	97.5	
	2.0 p.m.	98.7	98.3	
	7.0 p.m.	98.9	98.9	
	11.30 p.m.	99.7	98.5	
May 12.	9.0 a.m.	99.3	97.7	
	3.0 p.m.	98.2	98.2	
	8.0 p.m.	98.5	98.5	
	12.0 p.m.	98.9	98.7	
May 13.	9.0 a.m.	97.7	97.7	After short walk.
	2.15 p.m.	97.7	97.6	
	7.15 p.m.	98.3	98.7	
	11.15 p.m.	98.4	97.3	
May 14.	8.0 a.m.	97.3	97.3	
	2.0 p.m.	98.5	98.0	
	7.30 p.m.	98.7	98.4	
	11.45 p.m.	98.3	98.3	
May 15.	9.0 a.m.	97.5	97.5	After rowing.
	2.0 p.m.	98.6	98.1	
	5.0 p.m.	98.6	98.2	
	11.30 p.m.	98.5	98.4	
May 16.	8.0 a.m.	97.1	97.1	After rowing.
	2.0 p.m.	98.5	98.1	
	5.0 p.m.	99.1	98.1	
	9.0 p.m.	100.9	99.0	
May 17.	8.0 a.m.	97.5	97.0	After rowing.
	2.30 p.m.	98.7	98.1	
	5.0 p.m.	99.0	98.5	
	8.30 p.m.	100.4	98.4	
May 18.	10.0 a.m.	97.5	97.1	After rowing.
	2.0 p.m.	98.3	98.3	
	5.0 p.m.	98.9	98.3	
	8.30 p.m.	100.0	99.0	
May 19.	11.0 a.m.	97.3	96.6	After short walk.
	5.0 p.m.	99.0	98.1	
	9.0 p.m.	98.9	98.6	
	9.30 a.m.	97.3	96.9	
May 20.	2.0 p.m.	98.5	98.5	After rowing.
	5.0 p.m.	99.5	99.0	
	8.30 p.m.	99.9	99.0	
	8.30 a.m.	97.3	95.7	
May 21.	2.0 p.m.	98.1	98.1	After rowing—eight upset.
	5.0 p.m.	98.4	98.3	
	8.30 p.m.	98.6	98.4	
	9.0 a.m.	96.6	96.5	
May 22.	2.0 p.m.	98.5	98.0	
	5.0 p.m.	98.8	98.6	
	9.15 p.m.	98.7	97.7	
	10.0 a.m.	97.1	97.0	
May 23.				

In the first experiment (May 6th to 23rd) no minute diary was kept, as was done in the second experiment (August 5th to 21st), and therefore my remarks will chiefly relate to the

latter. For convenience of reference I will call them A and B respectively.

Date.	Time.	Temperature of Mouth F°.	Temperature of Urine F°.	Remarks.
1878.				
Aug. 5.	2.0 p.m.	98.4	96.8	Working in the laboratory all day.
	7.0 p.m.	99.0	99.4	No particular exercise.
	11.0 p.m.	98.4	98.8	
Aug. 6.	8.30 a.m.	97.2	97.4	Between 8.30 a.m. and 3.0 p.m.
	2.0 p.m.	98.6	97.8	working in the laboratory. Dinner at 2.15 p.m.
	3.0 p.m.	99.0	—	At 3.15 p.m. started on a walk of ten miles; the outward journey was performed at an average speed of four miles an hour.
	3.35 p.m.	98.8		
	4.5 p.m.	98.8		
	4.30 p.m.	98.6	—	Rest of ten minutes or more.
	4.40 p.m.	98.6		
	5.30 p.m.	99.5	—	After walking between two consecutive milestones in a little less than thirteen minutes.
	6.10 p.m.	98.9		
	7.0 p.m.	98.8	99.2	After sitting for about an hour.
	7.45 p.m.	—	—	Cold bath.
	8.0 p.m.	98.7	—	8.15—9.30 sharp walk of about six miles.
	10.20 p.m.	99.0		
	11.10 p.m.	98.5	97.8	
Aug. 7.	8.45 a.m.	97.5	97.6	
	2.0 p.m.	98.6	98.6	Working all day in the laboratory.
	4.20 p.m.	98.8	—	No particular exercise.
	7.0 p.m.	99.1	99.2	
	11.0 p.m.	98.7	98.9	
Aug. 8.	9.0 a.m.	97.4	97.0	
	12.40 p.m.	98.8		
	2.0 p.m.	98.5	98.4	
	3.0 p.m.	98.6		
	3.15 p.m.	—	—	Took .5 grm. salicylic acid (natural).
	4.40 p.m.	98.6		
	5.15 p.m.	—	—	Took 1 grm. salicylic acid.
	6.15 p.m.	98.6		
	6.20 p.m.	—	—	Took very sharp walk, lasting thirty-five minutes, about two-and-a-half miles.
	7.0 p.m.	99.2	99.9	
	11.0 p.m.	99.0	99.7	8.15—9.30 p.m. sharp walk of about six miles; same as on Aug. 6th.
	11.5 p.m.	—	—	Took 1 grm. salicylic acid.
	12.0 p.m.	98.2	—	The acid has apparently produced no effect, unless a slight nausea and sick headache be attributed to it, more probably due to the heat of the laboratory.

Date.	Time.	Temperature of Mouth $^{\circ}$ F.	Temperature of Urine $^{\circ}$ F.	Remarks.
Aug. 9.	9.0 a.m.	97.4	97.6	Woke with a sense of numbness parieto-frontal. No headache.
	10.40 a.m.	98.2	—	
	10.45 a.m.	—	—	Took 1 grm. salicylic acid.
	11.45 a.m.	98.0	—	Bladder irritable.
	12.45 p.m.	98.0	—	Buzzing in the ears and slight deafness
	1.0 p.m.	—	—	Took 1 grm. salicylic acid.
	2.0 p.m.	97.6	97.5	
				Slight dizziness, and headache having improved, sharp walk about a mile
	2.30 p.m.	—	—	
	3.0 p.m.	98.4	—	Took 1 grm. salicylic acid.
	3.15 p.m.	—	—	Started on a walk of about six miles.
	3.45 p.m.	98.1	—	Rested about an hour.
	4.40 p.m.	98.1	—	Just before starting.
	5.0 p.m.	98.1	—	After walking twenty minutes at my utmost speed, with the thermometer in my mouth.
	5.40 p.m.	98.1	—	After return. Hearing decidedly indistinct, singing in the ears very annoying; considerable depression and languor.
	6.0 p.m.	—	—	Took 1 grm. salicylic acid.
	7.0 p.m.	98.4	98.8	
	9.0 p.m.	—	—	Conversation sounds distant and subdued; pupils considerably dilated; slight nausea; numbness and insensibility of scalp very marked.
Aug. 10.	9.30 p.m.	99.2	—	After short walk.
	11.0 p.m.	98.7	99.3	
	9.0 a.m.	97.4	97.8	
	12.20 p.m.	98.3	—	Hearing improved greatly, scalp still insensible.
	2.0 p.m.	98.0	98.2	
Aug. 11.	7.0 p.m.	98.8	99.4	
	11.0 p.m.	98.9	99.5	After short walk, about half a mile.
	9.0 a.m.	97.7	97.6	Working in the laboratory all day.
	2.0 p.m.	98.2	98.1	No particular exercise.
	7.0 p.m.	99.0	98.8	
Aug. 12.	10.30 p.m.	99.2	99.6	
	9.0 a.m.	97.4	97.6	
	2.0 p.m.	98.4	98.6	
	3.0 p.m.	—	—	Started on a walk of about nine miles.
	3.45 p.m.	98.4	—	After one-and-a-half miles gentle walking.
	3.56 p.m.	99.1	—	After ten minutes rapid walking.
	4.35 p.m.	98.3	—	After gentle walking and a rest of fifteen minutes.
	4.37 p.m.	—	—	Took one grm. salicylic acid.
	5.4 p.m.	98.1	—	After gentle walking.
	5.16 p.m.	98.5	—	After ten minutes very rapid walking.
Aug. 13.	7.0 p.m.	98.2	98.9	
	10.50 p.m.	98.4	99.0	
	1.45 a.m.	98.0	—	Working in the laboratory all night.
	3.45 a.m.	97.7	—	

Date.	Time.	Temperature of Mouth F°.	Temperature of Urine F°.	Remarks.
Aug. 13.	8.15 a.m.	97.5	97.5	7.30—8.30 walked about two-and-a-half miles.
	2.0 p.m.	98.2	98.2	
	6.30 p.m.	98.4	98.6	
Aug. 14.	11.0 p.m.	98.6	98.6	3.0—5.30 p.m. rowed about six miles in a heavy boat, last two miles without stopping. Cold bath.
	9.15 a.m.	97.2	97.4	
	2.0 p.m.	98.2	98.4	
Aug. 15.	6.0 p.m.	—	—	7.30—9.30 p.m. same walk as on Aug. 8th, trotted last three-quarters of a mile on returning.
	6.50 p.m.	98.4	98.2	
	11.0 p.m.	98.2	98.8	
	9.15 a.m.	97.6	97.6	
	2.30 p.m.	98.0	98.4	
	6.30 p.m.	98.3	98.8	
Aug. 16.	10.0 p.m.	99.4	100.1	All night in the laboratory.
	11.0 p.m.	98.0	99.0	
	2.30 a.m.	97.4	—	
	9.15 a.m.	97.4	97.4	
	2.0 p.m.	98.0	98.4	
	7.0 p.m.	98.4	98.7	
Aug. 17.	11.0 p.m.	98.1	98.3	2.45—4.15 p.m. walked about five miles. 9.30—10.0 p.m. sharp walk one-and-a-half miles. 10.0—10.45 singing.
	9.30 a.m.	97.6	97.6	
	2.0 p.m.	97.8	98.2	
Aug. 18.	6.30 p.m.	98.2	98.6	7.0 p.m. short sharp walk, half a mile.
	10.55 p.m.	98.8	99.5	
	9.20 a.m.	97.6	97.9	
	2.0 p.m.	98.9	99.0	
	7.20 p.m.	98.8	99.3	
Aug. 19.	11.0 p.m.	98.8	99.2	
	10.0 a.m.	97.8	97.6	
	2.30 p.m.	98.2	98.2	
Aug. 20.	6.30 p.m.	98.2	98.2	8.30 p.m. sharp walk about one-and-a-half miles. All night in the laboratory. Walked about two-and-a-half miles.
	11.0 p.m.	98.0	98	
	9.30 a.m.	97.4	97.7	
Aug. 21.	2.30 p.m.	98.0	98.0	
	7.30 p.m.	98.0	98.4	
	11.15 p.m.	98.1	98.4	
	6.0 a.m.	—	—	
	8.0 a.m.	97.3	97.8	
	2.0 p.m.	98.2	98.2	

N.B.—Where no remarks are made as to occupation, &c., the time was spent in the laboratory.

The temperature of the urine was taken by allowing it to flow at the time of passing over the bulb of an ordinary small clinical thermometer, placed as near the ureters as possible, another thermometer being at the same time placed under the tongue, and kept there for about seven minutes.

The one obvious fact is, that as a rule, and indeed with hardly an exception, the temperature of the urine was higher than that of the mouth. In addition we may notice, that whilst both were raised by exercise, the urine was apparently more readily affected and to a greater degree than the mouth; and further, that the morning temperatures, on waking, were almost identical. I may here state that my own temperature is, as a rule, slightly below average.

Considering, first, Experiment A, the highest temperature appears generally to have been reached about seven o'clock in the evening, the difference between the maximum and minimum being often as much as two degrees before the rowing was begun. All the exceptionally high urine temperatures were taken after some more or less severe exercise — walking or rowing.

The effect of the rowing is very marked, the temperature of the urine on May 16th at 9 P.M. being  $100^{\circ}9$  F., and  $100^{\circ}4$  F. at 8.30 P.M. on May 17th; and a considerable rise is exhibited on the other days.

The more accurate observations of Experiment B exhibit the same general results, but the record of exercise of the action of the salicylic acid enables us to amplify them considerably.

On August 5th the ordinary difference between the two is shown, viz., about half a degree, though what is the explanation of the high temperature of the mouth at 2 P.M. compared with that of the urine passed at the same time it is difficult to say. It can hardly have been an error of observation, as it occurred twice on August 6th and again on August 8th, 9th, and 11th, and in the previous experiment on May 13th.

The observations of August 6th were intended to show the extent to which the temperature of the mouth could be raised by exercise. It is to be remarked that the temperature of the mouth at seven o'clock on August 7th was nearly as high without any special exercise, which leads to the conclusion that the

salicylic acid did not affect the seven o'clock temperature on August 8th. But when we come to the data obtained on August 9th, there appears to be no doubt but that the effect of the drug was considerable; not let it be noticed, in lowering the temperature so much as in preventing the rise which previous experiments show would normally have taken place.

The quantity of acid taken on August 12th appears to have been insufficient to do more than *check* the rise of temperature, and the effect passed off rapidly.

The general results of these observations may be summed up as follows:—

(1) That the temperature of the urine is probably always higher than that of the mouth.<sup>1</sup>

(2) That whilst exercise raises the temperature both of the mouth and the urine, the latter is much more readily affected than the former, and perhaps in a greater degree.

(3) That salicylic acid affects both temperatures, but the mouth more than the urine, rather preventing a rise than causing a fall.

(4) That whatever be the causes of the ordinary daily variations of temperature, they affect the urine as well as the mouth.

I may state in conclusion that I have failed to establish any connection between the rise of temperature and the quantity of the urine, or of its constituents, which might be expected, on the supposition that the kidney is an actively secreting organ; but, considering the methods of observation used, this proves little or nothing.

I append the results of some further observations on the temperature of the rectum and urine, from which it appears that the rectum temperature is generally higher than that of the urine. And also some temperatures in typhoid fever, kindly obtained for me by Mr. Fowler, House Physician at Addenworth's Hospital, Cambridge.

<sup>1</sup> I have observed an obvious connection between the temperature of the urine and its quantity. Observations on small quantities are probably of very little value.

Date.	When taken.	Temperature of Urine.	Temperature of Rectum.	Temperature of Mouth.	Temperature of Thigh.	Remarks.
1878.						
Oct. 9.	12.0 midnght.	98.0	98.4	—	—	After sitting for two hours.
Oct. 10.	8.0 a.m.	98.0	98.4	—	—	
	2.0 p.m.	98.6	98.9	97.9	—	After three hours' sitting.
	7.30 p.m.	98.8	99.4	98.3	—	Dinner at 6.30.
Oct. 11.	11.0 p.m.	100.4	101.1	99.3	—	After one hour's very rapid walking.
	8.0 a.m.	98.0	98.3	—	—	After one hour's sitting.
	11.15 a.m.	98.6	98.8	—	—	After a walk about two miles.
	12.45 p.m.	99.2	100.6	—	—	After two hours' standing.
	3.30 p.m.	99.2	99.7	—	—	After sitting some time.
Oct. 12.	9.15 p.m.	98.6	99.0	97.9	97.5	After four hours' sitting.
	12.30 a.m.	97.8	98.1	97.5	—	Taken before rising.
	8.0 a.m.	98.0	98.2	96.6	—	Taken twenty minutes after in order to observe the effect, if any, of the vertical position.
	" "	—	98.2	—	—	The low temperature of the mouth is probably due to my having taken some cold water a few minutes previously.
	11.15 a.m.	99.0	99.5	—	—	After short sharp walk.
Oct. 13.	1.45 p.m.	98.7	99.0	97.6	—	After sitting.
	4.15 p.m.	98.8	99.4	98.7	—	
	11.15 p.m.	99.0	100.0	—	—	After three hours' standing.
	10.45 a.m.	98.0	98.4	—	—	
	3.0 p.m.	98.8	98.9	98.0	—	After three hours' sitting.
Oct. 14.	9.30 p.m.	98.2	98.4	97.6	—	After two hours and a half sitting. Dinner at 6.30.
	3.15 a.m.	98.0	98.4	97.4	—	After five hours' sitting.
	12.0 noon	98.4	98.8	98.0	—	After two hours' sitting.
	5.0 p.m.	98.8	99.0	97.6	—	After three hours' sitting.

## TEMPERATURE IN TYPHOID FEVER.

	Axilla.	Urine.
	103.8	105.8
	103.6	105.2
(?)	101.2	105.2
	101.2	103.2
	103.4	104.0
	103.6	105.0
	99.6	101.2

## ON THE TREATMENT OF THE NIGHT-SWEATING OF PHTHISIS.

BY WILLIAM MURRELL, M.D., M.R.C.P.,

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(Continued from p. 99.)

### VIII.—DOVER'S POWDER.

It is a noteworthy fact that pathological sweating may be arrested not only by drugs that exert an inhibitory action on the sweat centres, but also by agents that in health promote perspiration,

Dr. Leared<sup>1</sup> speaks highly of the Turkish bath as a remedy for the nocturnal perspiration of phthisis. He says: "The direct action of the bath has been more strongly shown in removing night-sweats than in any other symptom."

M. Vignard, of Nantes,<sup>2</sup> recommends sage tea in pathological sweatings. He records the case of a young man who for many years had suffered profusely from night-sweating. It generally began about two or three o'clock in the morning, and was so profuse that it saturated the bed-clothes, and to a considerable extent the mattress also. Sulphate of quinine was tried in vain. At length M. Vignard prescribed the following preparation:—"Take of chopped sage a large pinch; of water six fluid ounces. Boil the sage a minute or two in water, let it stand to cool, then filter and sweeten to taste." The perspiration ceased whenever the decoction was taken, but re-appeared when it was omitted.

<sup>1</sup> "On the Treatment of Phthisis by the Hot Air Bath."—*Lancet*, 1863, vol. ii.

<sup>2</sup> *Journal de Méd. de Nantes*.

The employment of Dover's powder in the treatment of the night-sweating of phthisis is by no means new, and was, it is said, first suggested by Stokes, of Dublin. In 1861 M. Descamps published a paper<sup>1</sup> giving the result of eighteen years' experience of this mode of treatment. The effect surpassed his expectation, the result being uniformly successful, and the sweating being suppressed from the first. "We possess," he says, "several records of cases of phthisis in which the perspiration was arrested up to the period of death. The powder was generally given in the dose of fifty centigrammes (about seven and a half grains) in the evening, at different hours, according to that which announced the commencement of the sweating, and not only was it always observed that it prevented this symptom, but it also diminished diarrhoea, allayed cough, and predisposed to sleep. It sometimes happened that the powder was vomited, in such cases the dose was divided into two parts, one of which was given in the evening, and the other during the night when the patient awoke." Dr. Handfield Jones,<sup>2</sup> referring to M. Descamp's recommendation, says that he has found Dover's powder "materially to check the night sweats of phthisis." Dr. Hayden<sup>3</sup> in a paper read before the Medical Society of the College of Physicians of Dublin, in March, 1877, speaks highly of this mode of treatment. He gives five grains once or twice in the course of the night. This treatment has been recommended by Dr. Ringer,<sup>4</sup> and by M. Desnos, of the Hospital St. Louis, Paris; Dr. Theophilus Thompson also mentions it in his lectures on consumption. During the last two years I have taken notes of fifty-five cases of night-sweating of phthisis treated with Dover's powder. In only five of these cases did the drug fail to afford some relief. Of the successful cases thirty-four were men, and sixteen women. With two exceptions they were adults in the prime of life, their ages ranging from nineteen to thirty-six. The cases under treatment represented all stages of the disease. In some there were hardly any physical signs, whilst in others both lungs were extensively diseased. In eighteen cases cavities

<sup>1</sup> "On the Employment of Dover's Powder in the Perspirations of Phthisis."—*Gazette Médicale de Lyon*, January, 1861.

<sup>2</sup> *Studies of Functional Nervous Diseases*. 1870, p. 810.

<sup>3</sup> *The Dublin Journal of Medical Sciences*, April, 1877.

<sup>4</sup> *Handbook of Therapeutics*. Seventh edition, p. 538.

were diagnosed. In fifteen cases both lungs were involved, while in the remainder only one lung was affected, or there were no physical signs. The duration and severity of the night-sweating varied much in different cases, but in all it was well marked. As a rule the Dover's powder was given only at bedtime, but in a few cases small doses were given several times a day, though without any corresponding advantage. It was found that to do any good five or ten grains must be given, and ten grains usually acted more promptly than five. Smaller doses usually failed; whilst, on the other hand, there was no advantage in giving more than ten grains. Frequently, for convenience of dispensing, the Dover's powder was given in five-grain pills, but in many cases the powder itself was used. In most cases the patients, whilst taking the Dover's powder, had no other medicine, except, perhaps, a placebo of camphor water or peppermint. In other instances the Dover's powder was not allowed to interfere with the general treatment, the patient taking cod-liver oil, cough medicines, and so on. The Dover's powder acted equally well whether given alone or with other remedies. As a rule there was an improvement on the first or second night, but sometimes the sweating did not entirely cease for a week or more, declining gradually in severity. Sometimes the sweating returned immediately on discontinuing the medicine, but in other cases there was no relapse for a month or longer. In no single instance was the treatment found to do harm. It often, in addition to stopping the sweating, eased the cough and insured a good night's rest.

The following may be taken as a fair average example of what Dover's powder can do. It is not by any means an exceptional case, and it would have been quite easy to have picked out others in which the relief was most prompt.

R. W., a bookbinder, aged 26, had suffered from a slight cough for ten months, but it was only during the last three or four weeks that he had any expectoration. He was extremely emaciated, and had lost a stone in weight in six months. He was very feeble, and had great difficulty in doing his work. There had been no hæmoptysis. He had suffered from night-sweats for about three weeks, never missing a night. He usually went to bed about ten, and awoke in the early morning covered

with moisture. He was so wet sometimes that it left a mark on the sheet where he had been lying. The physical signs were—at the left apex flattening, deficient movement, increased vocal fremitus, dullness, and coarse crepitation; on the right side impaired resonance and a little scattered crepitation. His father and one brother had died of phthisis. He was ordered ten grains of Dover's powder every night at bed-time, and a little infusion of quassia as a placebo. For two nights there was no improvement, but on the third night the sweating was much less; on the fourth and fifth nights it was very slight indeed, and on the sixth there was none at all. The pills were then discontinued, and with the exception of one night there was no sweating for four weeks. It then returned, the patient suffered severely for three or four nights, and then recommenced taking the pills. The sweating was again checked in four nights, the pills were discontinued, and there was no further relapse during the time the patient remained under observation, a period of six weeks longer.

Even in cases rapidly progressing to a fatal termination, Dover's powder will keep the perspirations in check, as shown in the following instance:—

Netchen H., aged 28, a bright, good-looking young woman, was first seen in October, 1877. She had had a cough for above twelve months, and it had of late been accompanied by a great deal of thick yellow expectoration. There had been no hæmoptysis. She was very short of breath, especially on exertion. She had fallen away considerably, and was very weak indeed. She was regular, but the catamenia were scanty and often delayed. Her hair had been coming off very much for some time. She had had night-sweating for four months, nearly every night, sufficiently severe to wet her night-gown. Temperature under the tongue (2.0 P.M.), 100.8° F. A large cavity was diagnosed on the right side, and there was softening at the left apex. She had not been under medical treatment, but had been taking cod-liver oil for some months. No immediate steps were taken to stop the perspiration, but an endeavour was made to improve her general health by the administration of arsenic, hypophosphites, &c., in combination with the cod-liver oil. At first there was a slight improvement, but it was only temporary, for

her temperature continued high; she lost flesh, and the lung mischief progressed rapidly. In December the sweating became much more profuse, and she was wet through night after night. She was ordered five grains of Dover's powder nightly at bedtime, and the sweating at once and completely ceased. An attempt was made to discontinue the powders, but the sweating immediately returned. She was perfectly comfortable if she had her usual dose, but was drenched with perspiration if it were omitted. She continued taking the powders till the night of her death, which occurred in January.

Although Dover's powder is a very useful remedy it is not uniformly successful. In the following case it completely failed.

J. D., a labourer, aged 33, first came under observation in October, 1877. He was at that time working as a bargee on the river. He was always out in the cold and wet, and was often greatly overworked. It was not uncommon for him to work twenty-four hours at a stretch. His father died of consumption and his mother of dropsy. He had had a cough for two years, and it was getting worse; he was "at it night and day," "there was no rest for him." There was not much phlegm, but what there was was "nasty thick yellow stuff," and he "had to cough a long time before he could get it up." About ten months ago he brought up blood for a fortnight, a mouthful at a time; sometimes the phlegm was streaked with blood now. He was very short of breath, and had been for nearly a year; "his breath was the worst part of him." He had lost flesh very much; he was only a skeleton to what he used to be; two years ago he was a fifteen-stone man, now he weighed only ten stone eleven, coat and all. The sweating at night was very bad; he had had it for ten months, almost every night that he was in bed. It began as soon as he went to lie down, and never stopped the whole night. It was all over the body, feet and head and all. It wetted his flannel and shirt right through to the bed, and you could scoop it off him. He never perspired in the day-time, but was very cold, even at his work. On physical examination a cavity was noted at the left apex, with coarse crepitation all over the lung, back and front. On the right side there was a little scattered crepitation. Patient was ordered a pill of five grains of Dover's powder every night

at bedtime, with an ounce of infusion of quassia three times a day. He took the pills every night for six nights, but it did the sweating no good; if anything, it was worse than before. He was then ordered a mixture of soda and calumba three times a day, with a pill containing two and a half grains of Dover's powder, to be taken every night at bed-time. The chest and back were at the same time freely painted with linimentum iodi. In a week's time he returned, and said he was better in himself, but the night-sweats were as bad as ever. He was next ordered two five-grain Dover's powder pills at bed-time for a week, but they did him no good. He said he had to struggle for his breath at night so much, and that, he thought, brought on the sweating. The Dover's powder having completely failed, he was then ordered five grains of oxide of zinc every night at bed-time, but without the slightest benefit. The patient then ceased to attend. He frequently expressed an opinion that it was of no use trying to do anything for the sweating, as it was always brought on by the shortness of breath. It is not improbable that he was right, and that the shortness of breath was the cause of the profuse sweating; for Luchsinger has shown that asphyxia acts on the sweat-centre, increasing the secretion.

Here is another case in which the Dover's powder failed:—

F. C. F., aged 22, a clerk in the Post-office, had suffered from cough and expectoration for six weeks, or it might be a little more. There had been no hæmoptysis, and not much loss of flesh. He had had perspirations at night for about a week; they came on every night, and were very severe. He was wet all over, flannels, night-shirt, sheet and all. In the morning the water was standing on him just as if he had come out of a bath. It made him very weak, he said, and he had great difficulty in doing his work. At the right apex there was deficient movement, with dulness and coarse crepitation. Nothing wrong was detected on the left side. He was ordered a ten-grain Dover's powder every night at bed-time, with an ounce of infusion of quassia three times a day. A week later he reported that there had been no improvement in any way, and the perspirations were as bad as ever. The Dover's powder was continued for another week, being this time given in the form of pill, but the result

was the same. He was next ordered a grain of Dover's powder every night at bed-time, but this too failed. He then took a grain of Dover's powder three times a day for a week, but the perspirations were worse, often continuing till nine o'clock in the morning, causing great exhaustion. He was next ordered a pill, containing two and a half grains of Dover's powder, three times a day, but there was very little improvement. He then took a five-grain Dover's powder pill three times a day for a week, and this too failed. He was again ordered ten grains of Dover's powder at bed-time, and again it failed. He then ceased to attend.

Dover's powder will sometimes succeed after oxide of zinc and other remedies have failed.

C. F., aged 31, a cabinet-maker, had had a cough more or less all his life, accompanied at times by expectoration. For the last three weeks there had been a little blood in the sputa almost daily. There was great shortness of breath on exertion. During the last year he had lost flesh considerably. He had had night-sweats badly for a fortnight. On physical examination signs of softening were noted at the right apex. He was ordered cod-liver oil and hypophosphite of lime with ten grains of oxide of zinc every night at bed-time. He felt stronger and better in every way, with the exception of the perspirations, which were as bad as ever. He was then ordered five grains of Dover's powder at bed-time, and the sweating at once ceased. The powders were taken for six nights and then discontinued. A week later the perspirations returned, but were checked by the powders, after which there was no relapse.

The Dover's powder treatment succeeds even in children. A little girl, aged ten, having a vomica at the left apex, had suffered from night-sweating for a week. She was ordered five grains of Dover's powder nightly at bed-time; the sweating at once ceased, and there was no return of it. Dover's powder also answers well in elderly people. A man, aged 52, a clerk out of employment, who had been "hard up" for two years, and had been much exposed to bad weather in walking about the streets looking for employment, was considerably benefited. He had softening at the right apex, and had suffered severely from night-sweating.

Dover's powder is useful in some forms of sweating not due to phthisis.

C. B., aged 19, a porter in a hotel, had suffered from night-sweating every night for a fortnight. It usually commenced two hours after going to bed, and continued all night. It was most profuse, and wetted the night-gown and sheets; the night-gown was so wet that it had to be hung out to dry in the morning. He had never "picked up" since he had "low fever" some fourteen weeks before. He had no cough and no expectoration, and there had been no hæmoptysis. He complained of occasional pains in his joints, chiefly in the knees and shoulders. No abnormal signs were detected in the chest.

He was ordered ten grains of Dover's powder every night at bed-time. The first night the perspiration was less, although still enough to wet his night-gown; the second night there was still further improvement, and on the third night there was no sweating at all. The powders were then discontinued, and although the patient was under observation for some weeks longer, there was no return of the perspirations.

It is often very difficult to make an estimate of the relative value of different modes of treatment in any disease; but I have no doubt that for the night-sweating of phthisis Dover's powder, although it may be inferior to atropia, is far more reliable than oxide of zinc.

*(To be continued.)*

## Reviews.

*Manual of Practical Chemistry.* By ALEXANDER WINTER BLYTH, M.R.C.S., F.C.S. 8vo. pp. 468. London: Charles Griffin & Co.

THIS work is divided into two parts—one devoted to the analysis of the principal articles of diet in daily use, and the other to the detection and estimation of poisons, organic and inorganic. It contains a short and clear account of the best methods of detecting adulterations in food, and discovering the presence of poisons. In addition to this short notes are given of legal cases bearing on questions of adulteration; and prominence is given to the special points on which the evidence of an expert will be looked for in court. To each article is appended a bibliography of the works and papers consulted, so that the reader who wishes for more information may at once know where to find it. There are numerous typographical errors, especially amongst the proper names, e.g., "Gorop-Besinar" instead of "Gorup-Besanez," p. 65, and "Semiediberg" instead of "Schmiedeberg," p. 347; but with this exception the book seems well and carefully done. The account of copper as a poison is given in a very impartial manner; and although the symptoms produced by various poisons are purposely either left out altogether or briefly discussed, yet under the head of milk, for example, the various maladies which may arise from an impure article are fully detailed, and much interesting information given. The book is likely to be useful not only to chemists, but to medical men generally, and all who are interested in public health.

*Medical Therapeutics.* By GEO. H. NAPHEYS, A.M., M.D. Sixth edition, 8vo. pp. 607. London: Baillière, Tindall and Cox. Philadelphia: D. G. Brinton.

THIS work contains a summary of the chief modes of treatment recommended in text-books and monographs on diseases, and in the pages of medical periodicals. It gives general directions for treatment, mentions the chief drugs which have been found useful in each disease, and gives the formulæ recommended for their administration.

In such a collection as this we meet the names of well-known medical writers in close juxtaposition with others which we have

never previously heard, and the modes of treatment recommended may be either good, bad, or indifferent, for in many instances we have no guarantee whatever of their quality. Notwithstanding this, we think the book meets a want, for not unfrequently when one method of treatment fails it is convenient to know what others have been considered efficacious by others; and although such a work as the present may be condemned by some as tending to routine practice, we agree with a remark in the preface to the book, that the diversity of treatment it exhibits will rather teach independence of thought, at the same time that it may save time which might otherwise be spent in hunting through the pages of medical journals for the information which is here collected.

*Recherches expérimentales comparatives sur l'Action du Chloral, du Chloroforme, et de l'Éther.* Par S. ARLOING. Paris: Masson, 1879.

PROFESSOR CHAUVÉAU'S physiological laboratory at Lyons is well known to be one of the most complete in Europe; and in appliances for the graphic method of recording phenomena it is second to none. M. Arloing may be congratulated on his work, which is worthy of the laboratory from which it comes; it abounds in long and troublesome experiments, illustrated by numerous tracings and gas analyses. M. Arloing's practical conclusions are these: that if surgical interference necessitate anesthesia in disease of the heart, ether should be given in emphysema and dilatation of the right side; but chloroform in disease of the left side, or in atony of the heart; also, if in ordinary cases anesthesia have to be kept up for any length of time, then chloroform should be used rather than ether; and the same in trepanning, as chloroform contracts the cerebral vessels and diminishes the flow of blood through the brain: in cases of low temperature chloral should not be used, as chloral itself causes a fall in the thermometer.

We have seen with pleasure the establishment of a Faculty of Medicine at Lyons, and from the number of distinguished men who hold chairs in the Institution (unfortunately, it cannot be called a university, as since the days of the elder Buonaparte, there is but one for all France) the new Faculty can hardly fail to be a success, and draw to it young men from all the south of France. It should be noted too that the book, though still bound to be published at Paris, was yet printed at Lyons.

## Clinic of the Month.

**Experimental and Clinical Study of Conia and its Salts.**—M. Tiryakan has studied the alkaloid which forms the active principle of *Conium maculatum*. He finds that the conia whose action has hitherto been investigated is not a pure alkaloid, for it is mingled with an empyreumatic substance, whose effects, comparable with those of urari, have contributed to the belief that conia was possessed of much more intensely poisonous properties than is really the case. Conia has, however, a local irritant action which prevents its being administered by hypodermic injection. In poisoning by conia three phases can be distinguished. The first is characterised by depression and lowness of spirits, rapidly succeeded by paralysis of motion, and moaning during inspiration. During the second stage the moaning becomes gradually louder, whilst the respiration becomes feeble, incomplete, and hurried, the pulse-rate and the reflex irritability being at the same time increased. This stage is followed by one of collapse, accompanied by slowing of the pulse and respiratory rhythm, and ultimate death or recovery according as the elimination of the poison is impeded or hastened. From these observations it is concluded that conia acts upon the central nervous system, and is not a muscular or cardiac poison. M. Tiryakan has also studied the action of the hydrobromate and hydrochlorate of conia. He finds that the action of these salts is comparable with that of the alkaloid, but that they are so feeble that he is able to prescribe a gram of the hydrobromate in 3-5 doses in twenty-four hours. This remedy may be employed with advantage in neuroses, and in the spasmodic affections of chronic bronchitis. (*Le Progrès Médical*, June 14, 1879.)

**Chaulmoogra Oil in Leprosy.**—Dr. Wyndham Cottle calls attention to the value of chaulmoogra oil in the treatment of elephantiasis græcorum, of which disease he has recently had two cases in this country. In the first case the patient was treated for seven months with all the ordinary remedies, but the disease steadily advanced. Dr. Cottle then administered chaul-

moogra oil in five-minim doses, twice daily. The patient experienced no inconvenience, and the dose was therefore increased to ten, twenty, thirty, forty, and finally to sixty minims, thrice a day. The disease began to mend from the time the chaulmoogra oil was given—and very much more rapidly with the larger doses, the improvement being noticeable week by week during the last six weeks, whilst he had been taking the oil in drachm doses. The patient was also directed to apply daily to the affected parts an ointment of twenty grains of chaulmoogra oil to an ounce of lard. In the second case the oil was given at the commencement in drachm doses thrice daily, the only inconvenience experienced being slight constipation, which an occasional mild purgative removed. Under this treatment the patient is improving. Commenting upon these cases Dr. Cottle notices that there are some points of clinical importance to be observed in the administration of chaulmoogra oil. It should be given at first in small doses of three or four minims, which as the stomach becomes more tolerant of it may be increased to a drachm. It should always be taken after food. It is apt to produce constipation and sickness, which are best combated by administering some mild purgative to ensure the regular action of the bowels, when the tendency to nausea will generally disappear. The oil may be prescribed as a mixture suspended in gum, or as an emulsion. Chaulmoogra is the oil expressed from the seeds of the *Gynocardia odorata*. Its melting-point being high, it is semi-solid at the ordinary temperature. Its taste and odour are not disagreeable, and it comes to us with a high Indian reputation as a remedy for scrofula, skin diseases, and leprosy. The value of the oil in lupus and in late forms of syphilis has yet to be determined. Patients appear to improve whilst taking it, in cases where cod-liver oil is not well borne. (*The British Med. Journ.*, June 28, 1879.)

**The Treatment of Albuminuria.**—M. Bouchet, of the Hôpital des Enfants Malades, Paris, records three additional cases in which fuchsin or the hydrochloride of rosanilin has been employed with benefit in albuminuria. In the first case the patient was a girl of eight years of age, suffering from chronic albuminuria and anasarca. The treatment consisted in the administration of 10–20 centigrams ( $1\frac{1}{2}$ –3 grains) of fuchsin per day in an aromatic mixture. Within five weeks the cedema, which had been considerable, entirely disappeared, whilst the quantity of albumin was greatly lessened,—was some days altogether absent. The albumin ultimately disappeared, and after examining the urine daily for a fortnight without finding any trace of it, the patient was dismissed cured. On increasing the dose from fifteen to twenty

M. Bouchet considers that this was a mere coincidence, and that the remedy is well borne even in larger doses. The second case was one of acute scarlatinal albuminuria occurring in a girl of seven years of age. During convalescence from scarlet fever general anasarca appeared, with abundance of albumin in the urine. Ten centigrams of fuchsin in pill were given daily for five days, when complete recovery took place. This case does not appear to be so conclusive as the previous one. The third is a case of nephritis with chronic albuminuria and anasarca, in a delicate girl of fourteen, with a previous history of typhoid fever accompanied by marked cerebral symptoms at three years of age. There was an abundant precipitate of albumin in the urine. During the treatment, which lasted two months, this patient took 15–16 grams of fuchsin without any bad effect. The urine, which was deeply coloured red by the remedy, at once lost a considerable proportion of the albumin, by the end of six weeks there was a mere trace, and in two months it had completely disappeared. (*Gaz. Méd. des Hôpitaux*, Jan. 21st, 1879; *The Glasgow Med. Journ.*, vol. xi. No. 3, 1879.)

**Nitrite of Amyl in Chloral Poisoning.**—Dr. Sinclair Coghill publishes the following interesting case. A man, aged 62, of spare habit, took a large dose of hydrate of chloral. In a few minutes he became insensible, but medical assistance being at hand, his case was observed from the commencement. When first seen by Dr. Coghill two hours later, artificial respiration had been kept up for some time, but only with the effect of inducing feeble, superficial, gasping respirations at the rate of four a minute. The surface was cold and deeply cyanosed, and the pupils strongly contracted to the size of a pin's head. The pulse, however, was 80, full, but soft and compressible. The tongue was therefore pulled forward, and maintained in that position with forceps. Taking the state of the pupils as an indication, about twenty drops of the nitrite of amyl were administered by inhalation from a handkerchief. The effect was immediate. Within two minutes warmth had returned, even to the extremities, and the surface had assumed the hue of health. Within ten minutes the respirations had become much deeper, reaching nine per minute, and afterwards gradually increased up to twelve. The amyl had to be repeated in a smaller dose in about two hours with permanent effect. On the following morning the general condition was found to have improved somewhat, but there was no return of consciousness; and an attempt to give fluid nourishment by the mouth had produced great embarrassment of breathing. An enema of brandy and Liebig's extract in arrowroot was consequently ordered to be given every two hours. After the second enema the patient

became quite sensible, recognised and spoke to those around him, and swallowed some food with little trouble. The patient continued to improve till 9 P.M. in the evening, when he suddenly started up as if from sleep, threw up his hands, uttered a cry, and fell back dead. Dr. Coghill thinks that this fatal result might possibly have been arrested by a more copious and frequent stimulation per anum. (*The British Med. Journ.*, June 28, 1879.)

**Treatment of Diphtheria by Carbolic Acid and Iodoform.**—Dr. Garnett has proved that the topical application of carbolic acid and iodoform in cases of diphtheria is most beneficial. The principle underlying the treatment is the destruction of the false membrane by the careful application of a caustic solution of carbolic acid in glycerin, and rapidly subduing the cedema by lightly brushing over all the swollen parts with the same remedy: and then the direct application of iodoform to any shaded or ulcerated spots, to heal the broken surface, to act as antiseptic, and to allay the pain, irritability and extreme sensitiveness of the diphtheritic membrane. The carbolic acid should be lightly applied with a camel's hair pencil under the light of a mirror. The strength of this solution should be proportioned to the thickness of the false membrane, the object being its complete destruction and removal. In cases seen early, a solution of equal parts of carbolic acid and glycerin will answer well. Generally, in twelve hours after applying the acid, by a careful manipulation with the brush, the whole of the false membrane can be removed. By using the camel's hair pencil and freeing it of the superfluous liquid, the whole of the inflamed and swollen parts can be beneficially brushed over with it, but on the false membrane it should be used more freely, and if it is thick and heavy in a more concentrated form. The iodoform, reduced to an impalpable powder, should be blown into the fauces through a glass tube. The tube can be made to take up a sufficient quantity by dipping it several times in a vial containing the iodoform. All the ulcerated or abraded surfaces should be completely covered, and the patient ordered to avoid unnecessary swallowing, hawking, and other movements calculated to disturb the coating left in the fauces. Of course, some attention should be paid to the dose of iodoform thus introduced into the system. It is best to apply these remedies sufficiently often to fulfil the indications mentioned. Where false membranes show a tendency to rapid formation Dr. Garnett has used them three times a day for several days in succession. In all cases a mercurial purge should occasionally be given during the first stages, and quinia and iron during the decline of the disease. The method of treatment here advocated was first tried because of the

unsatisfactory results obtained from the methods in common use, and from the observation of the great benefit which is derived from the subcutaneous injections of carbolic acid in phlegmonous erysipelas as recommended by Huter, and its discutient effects in carbuncles and boils when applied concentrated to the surface. (*The American Journ. Med. Sci.*, vol. cliv., 1879.)

**Antiseptic Transfusion of Human Blood.**—Dr. Macewen has been successful in transfusing blood in a patient who was the subject of secondary hæmorrhage after lithotomy. The patient, aged 23, was greatly reduced by the hæmorrhage, which occurred 2½ hours after the operation. At the time of the transfusion he was partially insensible, and was unable to speak. The pulse was imperceptible at the wrist, the surface of the body was blanched, and bedewed with a cold perspiration, the lips were cream-coloured, and the conjunctival vessels were no longer visible. Occasionally he gave a restless, feeble toss, accompanied by a deep inspiration. The requisite blood was obtained from a fellow patient who was suffering from an injury to the right great toe, but was otherwise strong and healthy. The transfusion was made into the median cephalic vein of the left arm, the vessel being exposed for half an inch. The arm was maintained at some height above the level of the patient's body to facilitate the flow of blood to the trunk and to prevent the entrance of air into the body. Phlebotomy was then performed on the healthy man, the blood being received into a small warm carbolised vessel from which it was at once drawn into a warm carbolised three-ounce syringe with a narrow nozzle. When full the syringe was inverted and the piston pressed so as to expel any air, and the nozzle was then introduced into the vein. The blood was injected till only about two drachms remained behind, when the syringe was withdrawn and was washed in one to eighty carbolised aqueous solution, it was then recharged, and the blood introduced as before. The whole operation was performed under the spray, so that it was thoroughly antiseptic. Half an hour after the transfusion the face had assumed a slight redness, and heat began to be restored to the surface of the body. There were no rigors. The man slowly but perfectly recovered, and is now strong and healthy. (*The Lancet*, July 5th, 1879.)

**Liquor Ammoniaë and Digitalis in Cardiac Thrombosis.**—Dr. Churton cites the case of a married woman, aged 21, the subject, as was supposed, of cardiac thrombosis. In this case ℥xv of the liquor ammoniaë, B. P., with five minims of digitalis, were given every three hours in an ounce of water. Improvement soon occurred, and progressed so that on the fourth day she was able to lie down quite comfortably, whereas

previously she had only been able to breathe whilst sitting up. The râles which had been moist and audible posteriorly at the base of the lungs, had disappeared, and the pulse was fairly full and regular, but the second heart sound was, as before, distinctly double. There was less albumin than previously in the urine, but a diarrhœa from which she suffered was still persistent. The ammonia and digitalis were continued for fourteen days longer, when, as there had been no return of the urgent symptoms and the patient seemed anæmic, ℥xv tinct. ferr. perchlor. and two drachms of liquor ammoniæ acetatis in water were ordered to be taken three times daily. She was up and walking about, but the heart sound remained as before. A month later the reduplication was entirely gone, and the heart sounds were perfectly normal. The patient was gaining flesh and strength rapidly, and all trace of albuminuria had been lost. (*The Brit. Med. Journ.*, June 5th, 1879.)

**Treatment of Psoriasis with Pyrogallic Acid.**—Dr. Arragon has taken as the subject of the thesis for his M.D., a comparison of the local treatment of psoriasis by means of pyrogallic acid, with other methods. The pyrogallic acid is applied in the form of a pomade, made by mixing on the average 10 per cent. of the acid with lard. This preparation is to be applied to the affected parts, either with or without previous washing with soap, according to the case, by means of a stiff brush; it may also be applied upon a piece of linen, by manual rubbing, or by a wad of linen impregnated with the acid. In whatever way pyrogallic acid is employed, care should be taken to prevent its admixture with soap or other substances containing alkalis, for, if this should occur, the acid decomposes and gives rise to undetermined black products. The mean duration of the time required by pyrogallic acid to effect a cure in psoriasis is four weeks. With small doses and properly regulated applications this remedy cures, without pain or accident, except in a few cases. Occasionally after the use of too large a dose, or after repeated rubbings, acute irritation of the skin occurs, but this rapidly subsides when the drug is withheld, without leaving any superficial ulcerations or other marks. The more or less defined brown colour which pyrogallic acid sometimes gives to the skin, disappears in a few days. This treatment is especially suited to cases of obstinate psoriasis, in which other methods have failed. It is well at the commencement to order but a single rubbing in one day, and not to prescribe two successively until it is found that the medicine is well borne. As a rule baths are valueless, but their occasional use does not appear to be counter-indicated. Arsenic to be taken internally may be prescribed simultaneously with the pyrogallic acid. When the cure is

effected the brown stain on the skin may be effaced by the use of Labarraque water as a lotion either pure or diluted. The patient should finally be advised to spend a season at a watering-place and to pay great attention to his *régime* in order to prevent a recurrence of the disease. (*Le Progrès Médical*, June 28th, 1879.)

**Antiseptic Dressings with Boric Acid.**—Dr. Solger says that he uses boric acid in the antiseptic treatment of wounds in the following way. The cotton-wool which is going to be used in the dressing, is plunged into a 10 per cent. watery solution of boric acid, which is warmed to a temperature of 50° R., then taken out and allowed to cool down to 35° to 40° R., put on the wound, which has been previously thoroughly disinfected, and kept in its position by another layer of dry cotton-wool and a bandage. The high temperature of the dressing has a hæmostatic effect on the wound. According to the manner in which it is used, boric acid will either increase or lessen the property of cotton-wool, allowing the secretions of wounds to filter through it. If a plug of cotton-wool be soaked in a 15 to 20 per cent. solution of boric acid at a temperature of 60° R. and above, then allowed to cool down to 35° and spread out over the surface of a suppurating wound or abscess, or a fresh wound, and fastened by means of dry wool and bandages, the boric acid forms, on evaporating, a large quantity of boric acid crystals; at the same time the wool adheres so firmly to the skin that it entirely excludes the air and remains thus for months. On the contrary, the wool will allow the secretions to filter through it, if it has been soaked in a mixture of boric and carbolic acid (five parts of boric and two parts of carbolic acid, and 100 parts of water). Boric acid dressings will be found very useful in the minor surgical operations. (*London Medical Record*, June 15, 1879.)

**Pilocarpin in Nephritis.**—The following case occurred under the care of Dr. M'Call Anderson, in the Western Infirmary, Glasgow. The patient was suffering from acute desquamative nephritis, which came on suddenly with the usual symptoms—namely anasarca, highly coloured scanty urine, and tenderness in the lumbar region. On the previous evening he had been indulging rather freely, and had exposed himself to cold. When admitted there was some dropsy of the face and lower extremities, but none could be discovered in the trunk. The urine was highly albuminous—sp. gr. 1.018—and contained blood-corpuscles and a large number of tube-casts. Speedy improvement took place after admission, the urine increased in quantity, and the dropsy soon disappeared. About three weeks later the patient became quite convalescent,

and the urine ceased to show a trace of albumin. The treatment adopted was of the simplest character; no medicines were given, but the patient was kept in bed and put upon a milk diet. Five days after admission daily injections of a quarter of a grain of pilocarpin were commenced, and continued for some time. Marked lowering of the blood-pressure, profuse perspiration, and salivation lasting about half an hour, were caused by this means, but as distinct improvement had begun to show itself before the injections of pilocarpin were commenced, Dr. Anderson would not like to say how far it contributed to the recovery of the patient. (*The Glasgow Medical Journal*, vol. xi., No. 4, 1879.)

### **Atropin in the Treatment of Traumatic Tetanus.**

Mr. Cullimore has had occasion to treat a case of traumatic tetanus occurring in the person of a Lascar at Rangoon, after the amputation of the great toe. On the first appearance of the symptoms  $\frac{1}{16}$  of a grain of atropia was injected hypodermically over the dorsal spinal region, and was repeated three times daily. On the morning of the second day  $\frac{1}{16}$  grain was injected every four hours, and continued for six successive days, till the spasms had entirely ceased, and the stiffness disappeared from all but the muscles of the neck and face, which, as they were the first to become affected, continued longest under the influence of the disease. On the eight and ninth days the dose was reduced to  $\frac{1}{32}$  of a grain twice a day, and subsequently reduced to  $\frac{1}{64}$  of a grain at night for a further period of two days, ending on the evening of the eleventh day from the commencement of the disease, when the patient though not yet cured, was well out of danger and in a fair way to recovery. The bowels were throughout this period constipated, and were acted upon by four grains of calomel with forty grains of compound jalap powder, administered every other day. During the stay of the patient in hospital two grains of atropia were introduced into his system, without causing dilatation of the pupil or any continued increase of temperature: in fact there was no ascertainable physiological action, with the exception, perhaps, of drowsiness and slight occasional hyperæsthesia of the surface, which might have been due rather to the disease than to the remedy. (*The Lancet*, July 12th, 1879.)

**Agaricum in the Night-sweats of Consumptive Patients.**—Prof. Peter in his lectures on the treatment of tuberculosis, states that agaricum is one of the most efficient drugs for curing the debilitating night-sweats of tuberculosis. The drug is not new: it was first mentioned by De Haeny, and Andral experimented with it in the Hôpital de la Pitié. He proved that it has the power of preventing the sweating, and

that it may be given in doses of two grains without provoking any digestive trouble; a dose of three grains induced an attack of diarrhoea. He used to give it in doses of twenty centigrams. Troussseau ordered the same dose to be taken before bedtime, and always found it to answer very well, except in cases of very great cachexia, where the sweating was much reduced, but not entirely suppressed. Peter gives it in doses of from twenty to thirty centigrams with good effect. He illustrates its power by several cases in which it has proved efficient, of which we here quote the case of a young man who suffered from consumption, and had very profuse night-sweats. After entering the Pitié these sweats continued during the daytime also, and the patient was much reduced by them. Twenty centigrams of agaricus were given to him, and the night-sweats disappeared. The treatment was continued, and six weeks later the patient had regained flesh, felt much better, and left the hospital. (*The London Medical Record*, July 15, 1879.)

**Spasms of the Phrenic Nerve treated with Ether-spray.**—Dr. Regoni reports the following case. The patient had for eight days previous to his admission to the hospital been suffering from a continuous and very violent hiccough, which he attributed to having eaten a large quantity of vegetables and macaroni. The hiccough had begun an hour after the meal, and had increased in violence, so that the patient could neither eat nor sleep, and was very weak. Every attempt to take food, or even water, increased his sufferings, and was followed by bilious vomiting. While examining the patient the author was struck by the violent and incessant movements of the diaphragm, the thorax being comparatively quiet. The patient complained of dyspnoea and was slightly cyanotic. The stomach was much dilated and tympanitic on percussion. The pulse and heart were normal. The diagnosis of "spasm of the phrenic nerve" having been made, a spray of sulphuric ether was directed for ten minutes, first to the epigastrium, and then for five minutes on both sides of the throat. During the *séance* the hiccough decreased in violence and frequency; another application was made in the course of the forenoon, after which the patient slept for two hours. The treatment was repeated several times in the course of this day and the next, and the patient recovered. (*The London Medical Record*, July 15, 1879.)

**The Antifebrile Effects of Cold Enemata.**—In the *St. Petersburg med. Woch.* of June 14th, M. Lapin, one of the internes of Prof. Manassein's clinic, gives an account of the trials that have been made there of cold clysters as an antipyretic means. After noticing a few observations on the subject which have already been recorded, he gives an account of the

fifty observations which he has made in Professor Manassein's wards. Of these he has published a detailed account in a Russian journal, confining himself in the present communication to a general statement of the results. The following conclusions have been arrived at. (1.) Cold clysters form a practical means of reducing temperature, the influence of which continues for a considerable time. After clysters at  $10^{\circ}$  C., the temperature scarcely reaches its former height in the axilla, for from thirty to forty minutes, in the hypogastrium after an hour, and in the rectum after an hour and a half. With clysters at  $5^{\circ}$  C. the cooling in the axilla lasts for forty or fifty minutes, but in the hypogastrium and rectum it lasts a much longer time than when water at  $10^{\circ}$  C. is used, so that the prior high temperature has never been observed to be regained, until from two to two and a half hours after. (2.) The clysters at  $10^{\circ}$  C. are well borne in all cases without exception, sometimes leaving behind them a pleasant sense of coolness extending over the whole body. Those at  $5^{\circ}$  C. are by some just as well borne, but in others they induce unpleasant sensations in the abdomen. In recurrent fever even shivering may be produced. (3.) The depression of temperature is more considerable in cases of fever than in non-febrile affections, and in the healthy. (4.) Not only is the temperature diminished, but also the rate of the pulse and the number of respirations to a slight extent. (5.) The greatest diminution of temperature takes place in the rectum: next in the hypogastrium, and least in the axilla. (6.) An advantage of the cold clysters as an adjuvant of other energetic antipyretic means consists in their fulfilling other indications besides the depression of temperature. *a.* They remove the accumulation of the masses of fæces, which so frequently occurs in fevers. *b.* They diminish meteorism by contributing to the removal of gases. *c.* In this way they render possible greater freedom in the movements of the diaphragm, and remove a source of self-poisoning of the economy by means of the gases: *d.* To a certain extent, they diminish the afflux of blood to the organs in the vicinity of the rectum, especially the uterus and bladder. (7.) Stools follow the use of the clysters at different times in different individuals, varying from a quarter of a minute to two minutes and a half. (8.) There can be no doubt that when a clyster is also indicated in non-febrile cases, the cold clyster should be preferred to the warm in all those cases in which besides the emptying of the intestine, it is desired to produce a tonic effect on the canal, or to diminish the amount of blood in the pelvic organs. (*The Med. Times and Gazette*, July 19, 1879.)

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## Extracts from British and Foreign Journals.

**Therapeutic Employment of the Salts of Conia.**—Hemlock, of which the alkaloid is conia or cicutin, has long been employed in cancer, scrofula, syphilis and pulmonary or laryngeal affections accompanied by spasmodic phenomena. Conia and its salts are much less poisonous than is ordinarily supposed, though it produces all the effects of hemlock. It has been recently found that doses of the bromhydrate of conia are not active unless more than ten centigrams of the drug are administered. Tolerance of the medicine is rapidly produced, and consequently rapid increase of the dose is necessary, whilst, as elimination takes place very quickly by the kidneys, it has to be given in large doses. When a rapid action is required the bromhydrate may be given by hypodermic injection, and this in spite of the fact that conia itself has a local action which renders such a mode of administration impossible. A solution of one gram of crystallised bromhydrate of conia in nineteen grams of distilled water may be used for this purpose, 5 to 15 centigrams of such a mixture being employed for the first injection. The injections must be often renewed, and the dose rapidly increased to keep the patient under the influence of the medicine. By the stomach the increase of dose is comparatively easy, and very large doses may readily be given—50 to 60 centigrams or more in three or four doses—always taking care to habituate the system by smaller doses. Both pills and syrup are used. The following are some of the formulæ employed by M. Tyryakian: Bromhydrate of conia one gram, milk sugar one gram, mucilage, q. s. to be made into twenty or forty pills, each containing  $2\frac{1}{2}$  or 5 centigrams. A syrup may be made with one gram of the bromhydrate of conia, and 250 of simple or aromatic syrup, a teaspoonful containing two centigrams of the salt. For infants only 25 centigrams of the salt should be used, a teaspoonful thus containing 25 milligrams. For external use two grams of the salt in forty grams of cucumber ointment. It may be combined with bromide of potassium as in the following: Bromide of potassium 10 grams, bromhydrate of conia 1 gram, distilled

water 400 c.c. Each spoonful of 20 grams containing 50 centigrams of bromide of potassium, and 5 centigrams of bromhydrate of conia. For children, experimented upon, the dose did not exceed two centigrams of bromhydrate of conia. (*Journ. de Médecine*, Sept. 1878; *Chicago Med. Journ. and Examiner*, Nov. 1878.)

**Contribution to the Study of the Physiological Action of Arsenic.**—Drs. Elbridge, Cutler, and Bradford, of Boston, have made a number of observations upon healthy as well as upon anemic patients in regard to the influence which arsenical preparations exercise upon the proportion of corpuscles in the blood. The results of these experiments has been to show that Fowler's solution in medicinal doses rapidly diminishes the number of red and white corpuscles in the blood of patients placed under absolutely physiological conditions. In one case the number of red corpuscles in a cubic millimetre of blood sank, under the influence of arsenic, from 3,978,000 to 2,888,400 in the space of four weeks. This diminution was still more marked in the case of the white blood corpuscles, which were reduced from 4,712 to 1,087 per cubic millimetre of blood. As soon as the administration of arsenic was discontinued the number of corpuscles was rapidly increased. These results are in accord with the general theories which are held as regards the action of arsenic upon nutrition. In fact, this drug is looked upon as a retrenching medicine (*d'épargne* of G. Sée), or an inhibitory means (*moyen de cohhibition* of Gübler); that is to say, medicinal doses of arsenic lower the tissue-change in the body by reducing its expenditure. It is by the destruction of the red blood corpuscles which convey oxygen to the tissues that arsenic effects this reduction in the process of combustion, diminishing the necessity for breathing, whilst it favours the accumulation of fat in the tissues. The effects of arsenic do not continue long after its administration is stopped, and this result is explained by the rapid increase in the number of the red corpuscles which takes place after the discontinuance of the medicine. It is worthy of notice that in cases of anæmia the administration of arsenic at first increases, and then very rapidly diminishes the number of red blood corpuscles. Arsenic does not only hinder the formation of blood corpuscles, and interfere generally with the nutritive functions, but it acts locally by powerfully modifying the nutrition and circulation. Upon this hypothesis the improvement in the complexion which is such a constant effect of the administration of arsenic in medicinal doses is readily explained. It is to this action upon the nutrition and local circulation also that the beneficial results of the drug in certain skin diseases, in some forms of paralysis of the central nervous

system, and in enlarged spleen and liver in malarial fevers, is to be chiefly attributed. Gies, who has recently studied the effects of arsenic given in small doses to young animals upon the growth of bone, has demonstrated this action of the medicine upon the local nutrition of certain tissues. In young fowls, rabbits and pigs, with whose food increasing doses of arsenic ( $\cdot 0005$ — $\cdot 007$ ) were mixed, Gies found that the bones were harder and larger than in the average of animals of the same species. The spongy tissue was replaced, too, by compact bone. The epiphyseal cartilages of the humerus and femur were covered on their lower surface by a layer of compact and ossifying tissue. To explain these phenomena Gies allows that the animals which did not ingest the arsenic with their food absorbed portions of it which had been eliminated by the skin and lungs of the animals submitted to the arsenical régime. In proof of this it was shown that the same alterations took place in the bones of young animals kept in cages pierced with holes at the bottom, when arsenic had been sprinkled on the surface below. (*Gaz. Med. de Paris*, No. 21, 1879.)

**The Antagonism of Opium and Belladonna.**—Dr. Davis enumerates the following points of antagonism between opium and belladonna: (1.) Opium contracts, belladonna dilates the pupils. (2.) Opium constipates, belladonna relaxes the bowels. (3.) Opium retards the circulation and respiration, belladonna in moderate doses accelerates them. (4.) Opium dilates the veins and arterioles, belladonna, in moderate doses, contracts them. (5.) Opium induces profound sleep and coma, with low blood pressure, belladonna produces wakefulness and a talkative delirium, with high blood-pressure, followed by convulsions and stupor. The points of agreement of the same drugs are also alluded to. (1.) Both drugs produce dryness of the mouth and throat. (2.) Both drugs, in large doses, retard the circulation and respiration and dilate the arterioles. Both drugs destroy life in the same way, namely by a direct depressant action upon the respiratory centres and upon the heart. From a consideration of these facts, it can readily be seen wherein, and how far, the use of opium and belladonna as counter-poisons may be beneficial or injurious. Death occurs in opium poisoning from failure of the respiration; with a failing respiration we have a languid circulation, a congestion of the brain and arterioles, and the blood saturated with carbonic acid. Belladonna, in moderate doses, will stimulate the respiration and circulation, and induce contraction of the veins and arterioles. This is the limit of its usefulness in opium poisoning. It simply keeps the vital machinery in motion—unless too large a quantity has been ingested—whilst nature eliminates the poison. The smallest amount which will

increase the respiratory forces and stimulate the failing heart should be used. Pushed too far or given in too large an amount, it paralyses the nerve trunk and increases the danger. (*The American Practitioner*, Feb. 1879.)

**The Iodides of Cinchonidia and Quinia.**—Dr. Vansant has recently succeeded in isolating and analysing two distinct combinations of iodine with cinchonidia, and also corresponding combinations with quinia. For about three years past he has been using, with remarkable success, in a great number of cases of malarial, rheumatic, and constitutional syphilitic diseases, a combination of equal parts of quinia and cinchonidia sulphate, citric acid, and iodide of potassium dissolved in pure water; two grains of each of the solid ingredients being given at a dose, and this repeated three or four times daily. The protiodide of cinchonidia can be prepared from a solution of the citrate by the addition of potassium iodide, whilst the biniodide will be thrown down from such a solution by adding chlorine water. The protiodide occurs in the form of minute hexagonal prisms, sharpened at the ends, and grouped together in the form of a rosette. It is not freely soluble in cold water, but hot water dissolves it readily, and it is not precipitated on cooling: it is also soluble in alcohol. Its solution is neutral to test-paper, it is inodorous, but is intensely and peculiarly bitter to the taste. It produces no discoloration in solution of starch. When heated on platinum it melts, turns black, emits dark fumes, swells up, becoming a porous mass of charcoal, and finally entirely disappears without leaving any ash or residue. Biniodide of cinchonidia is a dark brownish red powder somewhat crystalline under the microscope, insoluble in cold water, or in solution of iodide of potassium or citric acid; strong solution of soda decomposes it with deposit of cinchonidia; it is slightly soluble in boiling water, from which it is precipitated on cooling; it is soluble in alcohol cold or hot, and is slightly soluble in glycerin. Its taste is disagreeable and metallic, but is less bitter than that of the yellow protiodide. It produces a violet tint when added in tincture to starch water. When the alkaloid quinia, or the officinal quinia sulphas of the pharmacopœia, is substituted for cinchonidia in the processes described above, similar reactions occur, though the resulting iodides of quinia are not precisely like those of cinchonidia. The protiodide of quinia when first formed has the appearance of a dense oily fluid, which gradually in the cold crystallises into amber yellow, transparent, acicular crystals that melt at a temperature of about 100° F., and are but slightly soluble in cold water though freely so in hot. The solution rotates the plane of polarised light to the left. The biniodide of quinia has also a crystalline character and is of a darker

red colour than the similar cinchonidia iodide. The crystals are very small, irregularly adhering together, and their shape is difficult to determine. It is non-volatile, insoluble in water, but soluble in alcohol, and strikes a violet colour with solution of starch. Dr. Vansant is unable to speak positively of the therapeutic value of the biniodides, as he has not yet given them a sufficiently extended trial, but he has found reason to believe that they are very active. Of the great medicinal value of the protiodide of quinia and of the corresponding salt of cinchonidia he is convinced. He has used the iodides of both these alkaloids in a very large number of cases, and he can think of no remedy that is so useful in such a variety of maladies, and has, at the same time, proved so generally satisfactory, as the protiodide of cinchonidia. It is a most excellent tonic in debilitated states of the system, arising from many causes; and it is useful in all that large class of diseases in which quinia or iodide of potassium, or both, may be required. The watery solution can alone be used without decomposition in connection with other medicines in special cases when desired, as, for instance, in combination with a small quantity of tincture of colchicum or of aconite, in rheumatism or neuralgia; with iodide of potassium in syphilis; with tincture of opium or solution of morphia in diarrhoea and dysentery; or with tartar-emetic and morphia in pneumonia or bronchitis. In malarial fevers it is more efficient and prompt than twice the weight of any of the alkaloids of cinchona, combined and administered as they usually are. The prescription usually given is as follows:—

R Cinchonidiæ sulph.	} aa 1·5 gram (about grs. xxij).
Potassii iodidi	
Acili citrici	
Aquæ destill. 175 cc. (about f. ℥vss).	

Dissolve the cinchonidia and acid in water, then add the iodide of potassium and agitate. Sig. Dose, a tablespoonful in water three or four times a day. (*The American Practitioner*, Jan. 1879.)

**The Treatment of Erysipelas.**—Dr. Hüter of Greifswald, believing that erysipelas is caused by bacteria, places it in close connection with diphtheria. Acting upon this hypothesis he has for a long time treated erysipelas by subcutaneous injections of a 3 per cent. aqueous solution of carbolic acid, a method of procedure which soon gained him many friends. Prof. Hüter now publishes the exact method of treatment adopted in seventeen cases which came to his clinic in the course of a year, together with the results obtained therefrom. The injection acts at the periphery of the exanthematous eruption (if such an expression may still be employed) by preventing its spread, but usually

only for about two inches. The greater the spread of the erysipelas the more quickly is the injection to be used. It is, therefore, necessary to treat the disease at the beginning, that is to say, before it has spread to any great extent, in order that as few injections as possible may be employed. With this object in view the resident officers of the clinic were instructed to attend carefully to every symptom which might give rise to a suspicion of erysipelas. It thus happened that during the year all the cases (seventeen in number, of which one was a case of pseudo-erysipelas) were recognised early, and were cured within a few days (eight times in one day, six times in two, and once in three and four days each). Before the carbolic acid was injected the wound was most thoroughly disinfected, and whenever unhealthy granulations appeared, 5-8 per cent. solutions of zinc chloride were employed with moist carbolised bandages. Two to five injections of the carbolic acid solution were at most required for the cure of erysipelas. (*Centralblatt für Chirurgie*, No. 5, 1879.)

**Benzoate of Sodium as an Antipyretic and Antiseptic.**

—This drug is being much used in Germany at present, and it has a sentimental, apart from its scientific interest, as a remedy which was given as a prophylactic against diphtheria, unsuccessfully, in the late epidemic among the Ducal family at Darmstadt. The ground for its administration was the fact alleged by Graham Brown, working in Klebs' laboratory at Prague, that an animal "saturated" with it could not be inoculated with diphtheritic membrane. Benzoate of sodium can be taken in doses of ten, fifteen, or twenty grams per diem without unpleasant effects, even if long continued. It reduces fever less rapidly than quinine and salicylate of sodium, but the effect is said to be more persistent. Klebs (*Prager. Med. Wochenschrift*, iv. Jahr., Nos. 3, 5) has reported a case of diphtheria in a child which appeared to recover under its use, and Lezterich states (*Berlin Klin. Wochenschrift*, No. 7, 1879) that of twenty-seven cases under his care (three adults, twenty-four children) all recovered but one. Hoffmann (*Berlin Klin. Wochenschrift*, No. 16, 1879) reports twelve cases of diphtheria (four adults, eight children), all of which ended satisfactorily. The doses given were in the proportion of six grams daily to a girl of eleven, five grams to a child of three, and ten grams to a woman of twenty-five years. Hoffmann and Klebs have both seen good results from the benzoate in erysipelas. In acute rheumatism Senator has stated that it has succeeded in some of his cases where salicylic acid had failed; but Hoffmann (*loc. cit.*) has seen no good from it whatever, even after doses of ten grams had been continued for over a week. In chronic rheumatism even Senator has obtained no benefit

from its use. Of other affections in which the benzoate has appeared to be useful, Hoffmann refers to albuminuria, both acute (post-scarlatinal) and chronic. In three cases the excretion of albumin diminished remarkably during its exhibition. Lastly, Petersen (*Centralblatt Med. Wiss.*, No. 10, 1879) relates a case of puerperal fever in a patient of twenty-five which seemed to be hopeless. The temperature was 40° Cent., pulse 140 to 150, and the general condition very bad. He gave at first ten grams of benzoate per diem, and reduced the pulse to 130, with improvement of the symptoms as a whole. With the above dose he at last reduced the temperature to 39°·5 Cent., and the pulse to 120, and the patient was able to sleep. On increasing the daily amount to fifteen grams the effect became decided: the temperature fell to 38°·5 Cent., and the pulse to 104, and complete recovery ensued. We do not lay too much stress on any of the facts just mentioned, but they seem to us, at least, to warrant a further careful trial of the benzoate in similar and allied diseases. (*Medical Times and Gazette*, May 31, 1879.)

**Antidotes for Strychnia.**—Dr. Husemann has confirmed the experiments of Amagat that in cases of poisoning by small doses of strychnia, the treatment with alcohol is to be preferred to the treatment by chloral. The reason for this is, that the quantity of alcohol required to neutralise the small but fatal dose of strychnia is not dangerous to life, although such may be the case from the amount of chloral administered. In investigations upon rabbits, absolute alcohol mixed with an equal portion of water to prevent the local coagulation of albumin, was found to cause death when administered in doses which are described by Amagat as innocuous. He thus shows the great difference in the susceptibility to alcohol which is found alike in rabbits and in man. It is therefore a matter of greater difficulty to define the exact dose of alcohol than of chloral which is necessary in a case of strychnia intoxication. As a result of his experiments, in which the author has only occasionally counteracted 1½ times the deadly dose of strychnia by the treatment with alcohol, the advice is given that no more alcohol should be administered than is necessary to counteract the minimal lethal dose of strychnia. Chloral is a still more certain remedy in cases of strychnia poisoning, even when the amount taken has been five or six times the deadly dose, whilst alcohol is unavailing if but two or three times the minimal lethal dose has been taken. The author has also found that a rabbit recovered from a single deadly dose of strychnia when it had been rendered insensible with physostigma. After larger doses of strychnia, however, the reflex irritability of the animal expe-

rimented upon was scarcely lessened by the physostigmia, so that the antidotal effect of this drug is less than that of alcohol. Dr. Husemann therefore holds that physostigmia is entirely useless as an antidote for strychnia poisoning, and he considers that the treatment with chloral is as yet the best method for any who are suffering from the effects of poisoning by strychnia (*Arch. f. exp. Path.* x. p. 101; *Centralblatt f. die. Med. Wiss.* May 17, 1879.)

**Decoctum Pollini in Syphilitic Eye Diseases.**—Three cases from the Ophthalmic Institute in Milan are described, in all of which the ocular trouble depended upon grave syphilitic disease. In each of these cases the Decoctum Pollini was employed after little or no negative results from the use of mercury and potassium. The first case was one of choroiditis occurring in a patient with papular syphilide and ulcerations of the palate and fauces. Under the use of the decoctum an improvement in the ophthalmoscopic appearances was noted, and the vision improved, although to what extent does not appear, as no accurate measurements are published. The second case was one of specific retinitis. The patient recovered from his ocular trouble, and after taking twenty-four bottles of the decoctum, left the hospital. The third case was one of acute iritis. The patient, a woman, entered the hospital on the 12th of December. She was ordered iodide of potassium internally—inunctions. Locally, for the eye, atropia and vaporised calomel. The iritis, however, grew worse, and the Pollinian cure was instituted on the 23rd December, omitting all other remedies except the atropic. In a month the patient left the clinic, and at the expiration of a second month she was well. To one familiar with the course of specific iritis, the impropriety of inferring that the decoctum of necessity relieved this patient is evident. Under the most favourable circumstances, this form of iritis reaches its acme but slowly, whilst it as slowly recedes. For purposes of a comparative study of the two forms of treatment, it may be noticed that the length of time allotted to the first was much too short. Each of the three cases are wanting in the careful statement and recorded vision which would be required to make them of scientific value. (*Giornale Ital. delle Mal. Ven. e della Pelle*, Feb. 1878, p. 15; *American Archives of Dermatology*, April, 1879.)

**Fur on the Tongue.**—The above title has been given by Mr. Butlin to a paper recently read before the Royal Society and now published in the Proceedings (No. 195) of that learned association. In this short memoir Mr. Butlin describes the relation of the fur to the papillæ of the tongue, and the character

of the organic germs of which that fur is almost entirely composed; for the epithelium constantly observed in tongue-scrapings, viewed under the microscope, is not essential, "depending," as the author expresses it, "rather on the vigour with which the tongue is scraped than upon the amount of fur present." The fur is found most abundantly immediately in front of the circumvallate papillæ, behind which it is not deposited. The fungiform papillæ are generally free from fur in childhood, and, owing to their smooth surfaces, are less thickly coated in the adult than the filiform papillæ, which, owing to their roughness and their epithelial processes, readily hold foreign bodies. In every case in which there is fur on the surface of the tongue, schizomycetes are found; and Mr. Butlin even observed, "a little of the gloea where no fur was perceptible to the naked eye." Thin grey fur resembles the thin grey pellicle which forms on bacterium-producing fluids. This pellicle becomes white and more opaque as it grows thicker; the fur on the tongue undergoes the same changes when deposited in unusual abundance. After cultivating portions of the fur on a warm stage several fungi were discovered, two constantly present, and these were micrococcus and bacillus. In all the author's experiments the development of micrococcus went on freely during cultivation, excepting in one instance, when "so rapid a formation of bacterium termo took place that in the course of a few hours the whole of the fluid was clouded and obscured by its presence." The fact reminds us of Mr. Watson Cheyne's recent researches. But Mr. Butlin states, immediately after the above quotation, that "usually the development of other fungi does not interfere with that of micrococcus." It appears to be otherwise with bacillus; for, though constant in the fur put under cultivation, it seldom or never developed, the presence of other fungi appearing to keep it down most effectually. This was, of course, under artificial conditions; but on the tongue bacillus evidently thrives, or it would not be so constantly found there. In some specimens of fur, sarcinæ and spirilla were found, and were readily cultivated. At a period when these strange organisms are exciting so much attention in the scientific world, Mr. Butlin's researches cannot fail to be of value, especially to all interested in the great anti-septic debate. (*The British Medical Journal*, June 21, 1879.)

**Disease of the Cranial Bones in Infantile Syphilis.**—M. Parrot lately showed three children at the Hospital Medical Society, Paris, in whom he had been able to diagnose hereditary syphilis solely from the presence of certain diseases of the bones forming the vault of the cranium. These lesions were so charac-

teristic that when they existed in 290 out of a total of 300 cases, there was hereditary syphilis. At about two months, or two months and a half, osteophytes begin to develop chiefly around the bregma or fontanelle. These excrescences give a peculiar shape to the head, which thus becomes occasionally tuft-shaped. In one case the child had not exhibited any other signs of syphilis; more frequently, however, other symptoms of the disease are manifested by the skin and mucous membranes, costal protuberances, and syphilitic rickets. M. Parrot also exhibited several skulls of syphilitic children. In these the bones of the cranium had been worn away by the action of the cerebral vessels, which had become more numerous than usual. These points of wear were generally at the places of contact with the pillow. The external and internal tables remained, but the diploe had become softened, whilst the bone had increased externally by the formation of an osteophyte, whose layers were arranged perpendicularly to the laminae of the cranial bones, instead of lying parallel to them. The shape of the bone corpuscles had also become modified, for they presented the appearance of tri-radiate stars, which thus resembled somewhat connective tissue corpuscles. The growth of these bodies is to be attributed to irritation of the periosteum. (*Le Praticien*, April 7, 1879.)

**The Therapeutic Action of Duboisia.**—This alkaloid, which was isolated in the early part of last year, is obtained from a small tree growing in Australia—the *Duboisia myoporoides*. Its therapeutic action has recently been investigated by Dr. Norris. The experiments made upon dogs, pigeons, and men, seem to indicate that duboisia is an agent similar in its action to atropia, but in some respects more energetic. Dr. Ringer has already shown how promptly it stops the sweating produced by pilocarpin, whilst Gühler has demonstrated its action in the night-sweats of phthisis. It would, therefore, appear that the therapeutic use of duboisia would be similar to that of atropia. As regards its local effects on the eye, its greater promptness of action, and the greater rapidity with which the dilatation of the pupil and the paralysis of accommodation caused by it pass off, render it superior to atropia for use in determining the refraction; while, on the other hand, its greater tendency to produce constitutional disturbance should cause it to be carefully used. In one case, in which Dr. Norris employed this drug in a small quantity, slight symptoms of poisoning manifested themselves, whilst in nearly every patient into whose eyes a four-grain solution of the sulphate of duboisia was dropped, complained of dizziness within a short time after its instillation, the fact

being most noticeable on rising from the sitting posture, either to walk about the room or to go into the street. They do not, however, complain so much of dry throat as those treated by atropia. In trying to tear loose posterior synechiæ Dr. Norris has been disappointed, and where they had previously resisted the persistent use of atropia there was uniform failure to increase the effect by the employment of duboisia. On the other hand it has been employed with satisfactory results in two cases where atropia called forth marked conjunctivitis. One of them was a severe iritis, and one a case of cataract, where, owing to capsulitis following extraction, it was extremely desirable to maintain dilatation of the pupil. Both of these did well under the use of sulphate of duboisia. (*The American Journal of Medical Sciences*, April, 1879.)

**The Treatment of Syphilis.**—Dr. Brandis is an entire adherent to the method of treatment by inunction in cases of syphilis, and he especially recommends it for children; he would also employ it in induration previous to the onset of the general symptoms. Dr. Brandis goes minutely into the question as to the time for making the inunction, and his rule is as follows:—So long as the healing of a syphilitic affection progresses under the use of mercury this treatment should be continued, and other remedies should only be employed when the favourable action of the drug ceases. The length of time required for the saturation of the system, and when that point is reached, the interval which must be allowed before the inunction can be again returned to, depends so much on the idiosyncrasy of the patient, that no rule can be laid down beforehand. In the majority of cases, however, the mercurial treatment can be adopted again after an interval of one or two weeks. ("Outlines of Treatment for Syphilis," Berlin, 1879, S. 44, Abstract; *Centralblatt f. Chirurgie*, No. 18, 1879.)

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\* \* Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BALLIÈRE, of King William Street, Charing Cross.

## Department of Public Health.

### PLAGUE IN THE CAUCASUS: A STUDY IN SANITARY SCIENCE.

BY DR. THOLOZAN,

*Physician to the Shah of Persia.*

DR. THOLOZAN has communicated to the Academy of Sciences a paper on the three last epidemics of plague in the Caucasus considered from an epidemiological and prophylactic point of view. The opinions expressed by Dr. Tholozan as a result of his examination of the facts of the epidemics referred to, especially with reference to the sanitary aspects of the subject, are of the highest interest. They manifest an approximation to the views commonly entertained in this kingdom by epidemiologists and the leaders in sanitary science on the same subject which is most welcome, and they can scarcely fail to exercise an important influence on French opinion. For some time there have been significant indications that French epidemiologists and the scientific leaders of sanitary opinion in that country have been modifying their opinion as to the utility of quarantine, as ordinarily interpreted and practised, as a prophylactic against plague. Still so much of the old leaven remains; and the influence exercised by French thought in this matter on the Continent is so great, that we are inclined to assign to it a principal part in that extraordinary paroxysm of quarantine which seized upon the greater part of the powers of the Continent, including France, at the time of the recent appearance of plague on the Volga. France has been the chief agent in cultivating those so-called "international" conceptions of hygiene which have hitherto manifested themselves in perpetuating effete notions of quaran-

tine; and if the late quarantine hysterics on the Continent shocked even French notions on the subject, she is not the less responsible for having fostered them without forethought as to their possible results. Let us hope that Dr. Tholozan's paper will induce French sanitary administrators and their advisers to ask themselves whether the notions and practices of quarantine still indulged in as to plague in France have any sound foundation in observation.

English readers will be struck with a certain vagueness in Dr. Tholozan's references to sanitary measures and administration in plague. Although he refers to the mischiefs arising from certain dogmatic conceptions as to "contagion," he fails to distinguish clearly the characteristic of the measures against plague exercised in the form of quarantine, to wit, that they are directed to certain hypothetical conceptions of plague, not to the observed facts of the disease. The conclusions of the great Report of the Academy of Medicine (1846) on the subject still remain for the most part a dead-letter in France. These conclusions as concerns the prophylaxy of the disease have received the most important confirmation from recent observations. Had the distinction we have referred to been sufficiently present in Dr. Tholozan's mind, he would probably have more clearly indicated what he doubtless means, in his concluding observations, that prophylactic measures which are not governed by a knowledge of the observed facts of a malady must necessarily be futile while every hope may rest with measures conceived from the opposite point of view. Dr. Tholozan's lesson is somewhat rudimentary, but it may not be the less useful on both sides of the Channel.

We reproduce, in an almost textual translation, Dr. Tholozan's paper from the *Comptes Rendus* (July 21, 1879):—

New or unpublished documents relating to the epidemics of plague which occurred in the Caucasus from 1828 to 1830, and from 1840 to 1843, which have been collected by Dr. Tholozan compared with the documents which he laid before the Academy in 1875, establish, he thinks, the following facts—namely, that three epidemics of plague occurred in the Caucasus from the end of the past century to the present time. The first of these epidemics was a true endemo-epidemic, which, beginning in 1798, persisted

with periods of remission and recrudescence, until 1818. This epidemic was connected with the epidemics in the pashaliks of Kars and Akhaltsik, without, however, necessarily depending upon them; for the disease had at the time established itself in Georgia, in certain mountainous districts of the Caucasus, and among the Nogays who live in the north-west of this region. This outbreak extended over all the Caucasus from west to east, even to the Caspian; but its chief foci were in Georgia, in the two Kabarda, and upon the Terek. Its progress was eccentric, but most marked and most constant towards the north, where the disease eventually reached Astrakhan in 1807 and Sarator in 1808, being here separated from Moscow by an interval of 856 kilometres.

The second epidemic commenced in 1828 and had its origin in Turkey. First localised in the west of Transcaucasia, in 1830 it suddenly invaded the whole of the country, extending from west to east, even to the neighbourhood of the Caspian. It appeared also on the north-east of the Caucasus, near the mouth of the Terek, at Kizliar. This outbreak presently ceased as quickly as it had begun. Its duration, its gravity, and its geographical extension were much less than had been observed in the previous endemo-epidemic. It proved that plague was not rooted in these regions, and that it was no longer able to repeat annually its ravages.

The third epidemic, that of 1840-43, was localised to the south-west of the Russian possessions in Transcaucasia, in the districts of Alexandropol, of Pembak, and of Erivan, at altitudes of 700 to 900 metres. This was a small epidemic, an offset of the great outbreak in Turkish Armenia at the same period.

The two last epidemics coincided with famine in the neighbouring Turkish provinces. In 1828 the Turco-Russian war was no doubt one of the causes of introduction of plague into the Caucasus.

The three epidemics were separated from each other by intervals of ten years. Their attentive study is confirmatory of the important fact that plague disappeared from Armenia, Syria, and Egypt after 1843—a disappearance foreshadowed more than twenty years before, in adjacent regions, by less numerous and less diffusive epidemics of the disease.

These facts, Dr. Tholozan states, furnish not only data as to the history of plague, but they further demonstrate that this malady, in the early part of the century, manifested, first, those movements in succession of increase and decrease which characterise all epidemic affections, and, afterwards, that progressive, and in the end, definitive effacement, which has led to a belief in the extinction of plague. These results, deduced from the facts studied in detail, differ widely from the hypothesis of a gross contagion which maintains, as to plague, a perpetual transmission of the same germs, endowed with fixed and immutable properties, and which never moderate in their action unless art intervenes to destroy them. Emitted ages ago, this conception, which cannot bear a serious examination, has been revived within the past forty years, for administrative and fiscal purposes. Profiting from the extinction of plague, the holders of the conception have affirmed that the disease had disappeared from Turkey in consequence of the restrictive measures decreed in that Empire in 1839. Little by little this system of restriction has gained ground, influencing many to whom epidemiology was a closed book and who knew not that observation had always shown that plague had natural periods of arrest and cessation. The history of plague has thus been obscured even to the present day. A very simple question, which only needed study, without preconceived idea, in the sole light of historical facts, has become encumbered by errors of all sorts which threatened a return to the time of Francastorius, had it not been that medical science in Europe possessed certain leading and independent spirits.

What is the true value of restrictive and hygienic measures against epidemics of plague? asks Dr. Tholozan. It suffices not to say, he answers, that they have triumphed over the disease, extirpated it, purged a country from it. It is necessary to prove that the measures employed have, many times at least, retarded or diminished the prevalence of epidemics of plague. It is necessary to compare the epidemics of a country where there is no sanitary administration with those of a country where such administration has long existed and been carried out, and to show any difference which may exist between two countries with regard to the intensity and frequency of epidemics. I do not doubt that a general advantage would be shown on the side of

the country where well-conceived sanitary regulations have been carried out. But it is not the less true that the only mode in which we can establish the effects of our measures either for extinguishing, arresting, or diminishing epidemics, consists in comparing the precautions taken with the results obtained. This verification has not been made, even to the present time, in respect to plague. So fixed is the belief in the means commonly employed, that the suggestion of inquiry into their efficacy smacks of heresy. Yet the contagion of plague is not a fact so well established that new investigations are not needed with regard to it for the purpose of determining, say, its extent and activity at various times and in various places. Has it at all times the same force; has the plague at all epochs the same power of expansion? Epidemics of plague have they not, as all maladies of this class—small-pox and diphtheria, for example—periods of great propagation and periods of sterility and spontaneous disappearance, independent of our means of action? These are questions which need broaching.

Before attempting to decide upon the action of a therapeutical agent, we seek first to determine the symptoms, the course, and the gravity of the disease for which it is prescribed. In the same way, researches upon the prophylactic value of restrictive and hygienic measures ought to be founded upon the previous study of epidemics; in other words, *epidemiology is as necessary to sanitary science as pathology is to therapeutics*. The purely scientific and retrospective inquiry to which these observations refer, by exhibiting the facts of the epidemics to which they relate, and the sanitary measures directed against them, has led to the seemingly paradoxical result (at least to some persons) that it is not demonstrated that the means employed with the greatest energy in the Caucasus, from 1804 to 1818, from 1828 to 1830, and from 1840 to 1843, exercised any sensible influence upon the progress and development of the epidemics of plague.

Other researches directed to the same end will probably arrive at a similar negative result; nevertheless, the sanitary administrations of the different countries of Europe will no doubt not the less continue to decree the same measures against plague as heretofore. European governments will prudently act thus in view of their own safety and of that of other countries with

regard to great epidemics. In practice many motives lead us to keep before us the capital principle—that sanitary measures, as therapeutical measures, if they do not succeed, at least give hope of success or alleviation. But the learned know that the means employed have not the efficacy hoped for in the majority of cases. A study of the facts recorded will have given them to understand with regard to the disappearance of plague after the last epidemic of 1840-43 in Armenia, Egypt, and Syria, was not a result of the measures it was practicable then to enforce against the disease; just as in the Caucasus and other places it has not been possible to discover any certain advantages from sanitary measures against plague directed and applied with the greatest care.

However extraordinary this result may appear, Dr. Tholozan concludes, it follows so clearly from the facts analysed and discussed that he has held it his duty to make it known.

## SOME RESULTS FROM A COMPARISON OF REGISTRATIONS OF DISEASE WITH RETURNS OF MORTALITY.<sup>1</sup>

BY WILLIAM SQUIRE, M.D., F.R.C.P.

THE advantages likely to follow from the establishment of any comprehensive registration of disease, though first felt in each town or district joining in the plan, would have a direct bearing upon the health of the whole community; our knowledge of all that spreads disease would be increased, and important statistical information would ultimately result.

In this country the attempts to obtain returns of sickness are few in number, and of too recent date for much to be said of the expectations warranted by the system of registration adopted. Five municipalities in England—Huddersfield, Bolton, Nottingham, Burton-on-Trent, and Jarrow—are empowered by

<sup>1</sup> The substance of a communication to the Epidemiological Society, June 4th, 1879.

local Acts of Parliament to make the notification of infectious diseases to the health officer compulsory. Similar powers are being sought in the present Parliament by Derby, Exeter, Leicester, Blackpool, South Shields, and Warrington. The provisions made are in several respects imperfect and incomplete; the two chief defects being that the returns are limited to infectious diseases only, and that the compulsory clauses are directed less to the householder than to the doctor, and consequently raise opposition where support is essential among the resident medical practitioners.

Mr. Edward Sergeant, L.R.C.P., Medical Officer of Health for Bolton, gives some valuable information as to the results of the first year's adoption of registration in that borough, both in a paper read last October at Stafford, on "The Compulsory Registration of Infectious Disease," and in his Annual Health Report for 1878. The registration commenced in September, 1877. Forms of certificate as to the existence of infectious diseases were supplied by the Corporation to every medical practitioner in the borough to be sent to the health department at the Town Hall, in case of small-pox, cholera, measles, scarlet fever, typhus, typhoid, or puerperal fever, and diphtheria.

No other diseases were to be included in the returns, and only the first cases of these in any house were to be reported. In this way, among a population of 94,000, in little more than twelve months from the first operation of the Act, 1,995 cases of infectious disease were registered by the sanitary authority as occurring in 1,554 houses.

The official return for the first year, from September 30th, 1877, to October 1st, 1878, is as follows:—

	No. of cases.	Deaths.
Small pox . . . . .	2 . . . . .	0
Measles . . . . .	566 . . . . .	42
Scarlet Fever . . . . .	1,093 . . . . .	144
Diphtheria . . . . .	17 . . . . .	2
Typhus Fever . . . . .	27 . . . . .	3
Typhoid Fever . . . . .	129 . . . . .	29
Continued Fever . . . . .	97 . . . . .	7
Puerperal Fever . . . . .	4 . . . . .	2
Cholera . . . . .	4 . . . . .	4
	<u>1,939</u>	<u>233</u>

The different quarters of the year in which the cases and deaths occurred are also given; from this it appears that scarlet fever showed its usual tendency to prevail in the last quarter of the year, and that measles increased in the spring, but as only the first cases in different families are registered, no conclusions can be drawn as to their proportional fatality. All the cases returned as cholera occurred in the hot season; but of the prevalence of diarrhoea generally, or of infantile diarrhoea specially, we have no account, nor is there any mention of whooping-cough.

Mr. Sergeant has kindly forwarded to me the returns for the last quarter of the year 1878, during which period there were eighteen deaths from whooping-cough.

TABULATED STATEMENT OF INFECTIOUS DISEASES FOR THE QUARTER ENDING DECEMBER 31ST, 1877.

	Small Pox	Measles	Scarlet Fever.	Diphtheria.	Typhoid Fev.	Continued Fever.	Puerperal Fever.	Cholera.	Total.
Diseases . . . . .	1	61	531	3	46	39	2	...	683
Deaths . . . . .	0	2	49	0	4	2	1	...	58

FOR THE FOUR QUARTERS OF THE YEAR, 1878.

	Small Pox.	Measles	Scarlet Fever.	Diphtheria	Continued Fever.	Puerperal Fever	Cholera.	Total.
<i>First Quarter—</i>								
Diseases . . . . .	...	172	247	5	67	..	...	491
Deaths . . . . .	...	9	40	2	15	..	...	66
<i>Second Quarter—</i>								
Diseases . . . . .	...	208	178	4	39	2	..	431
Deaths . . . . .	...	15	33	...	6	1	..	55
<i>Third Quarter—</i>								
Diseases . . . . .	1	125	137	5	62	..	4	334
Deaths . . . . .	...	16	22	...	12	..	4	54
<i>Fourth Quarter—</i>								
Diseases . . . . .	...	22	177	2	65	1	..	267
Deaths . . . . .	...	5	10	2	15	...	...	40

In the latter table only the first cases of disease in any one house are reported. There is evidence of a declining epidemic of scarlet fever, the fatality decreasing more rapidly than the number of cases: the other fevers are probably all enteric. So far one deduction may be warrantable: that the mortality returns guide fairly to the prevalence of disease.

The report says, the plan adopted largely contributed towards diminishing the deaths from fever and small-pox, and continues: "The information received of infectious disease has been of practical value in bringing to light unhealthy conditions in houses which might otherwise have existed until further disease, or possibly death, had taken place. In many cases we have been enabled to limit the spread of disease by careful attention to cleansing and disinfection of the house and clothing, and by the means taken to insure isolation of the infected patient as far as possible. The knowledge has also been beneficially used in keeping children likely to spread infection from attending school, and so assisting in eliminating a danger which ought not to exist. In future years the statistical knowledge gained of the distribution and fatality of infectious disease will be greatly interesting, and of immense scientific importance, and for the present may be considered as a valuable test of sanitary advancement."

The progress in this direction made by some of the United States of America is much more advanced. The plan proposed by Dr. Draper of Massachusetts has been very completely carried out by the State Board of Health for Michigan, under the able direction of Dr. Henry B. Baker.

Local Boards of Health have been established since 1871 by State laws in every township of Michigan. Prompt notice of "diseases dangerous to the public health" are given on blank forms, distributed to householders and physicians, with the sections of the law on this matter printed on the back. Each Board of Health is thus enabled to deal efficiently with local epidemics, while the State Board is supplied by the health officer of the Local Board with records of all important facts concerning prevalent disease.

The Report of the Michigan State Board of Health for 1878 shows how completely a mass of returns bearing not only upon

infectious diseases, but on all those most prevalent, such as bronchitis, pneumonia, diarrhoea, and ague, may be dealt with so as to bring out many facts of general interest.

Graphic diagrams of the prevalence of each disease for every month of the year are presented, which show at a glance the close general correspondence existing between the incidence of disease and the resulting mortality. We have here further proof, on an extended scale, that mortality returns are trustworthy evidence of the degree in which the more important diseases prevail. By comparing these diagrams with those constructed by Mr. Mitchell and Dr. Buchan, from the London registration of deaths, we see a marked coincidence between the seasonal extension of diseases there and the seasonal mortality with us. Bronchitis in the winter, pneumonia in the spring, diarrhoea in the heat of summer, and fever in the autumn, are most prominent in both. One only difference is observable, that caused by the great influence of malarial diseases in the American State, making the amount of sickness greater there in the autumn, though no yellow fever reached so far, than at any other time. The heat of August produces the same sudden increase of infantile diarrhoea as with us, and a greater mortality. Extending beyond this, from July to September, is a curve for dysentery, still fatal, and mostly to children: beyond this, again, is a still larger curve for non-fatal diarrhoea. A registration of disease with us would doubtless give a similar adumbration of this most destructive form of infantile sickness, and probably lead to some means of mitigating its ravages. The more contagious zymotic diseases show the same tendency to seasonal variations, as with us. Why small-pox and measles should extend in the spring, and scarlet fever in the autumn, and diphtheria in the winter, is difficult to explain; that they do so, or would do so if unchecked, is very widely observed. The two former diseases are much more restricted in America than with us; diphtheria is widely distributed throughout the American union; the amount of illness from this cause far exceeding what is observed in English towns, equalling, and often surpassing in intensity what is observed in France and Germany. The records of this disease in American States support the conclusions arrived at

by M. Ernest Besnier for Paris—that diphtheria extends as an epidemic in the winter.

The two epidemics that with us exert the greatest influence over infant mortality, are scarlet fever and whooping-cough, the former being most fatal in the autumn, the latter in the spring, the one subsiding as the other advances; and this with such regularity in London that scarlet fever always reaches its point of greatest intensity in the last week in October, and its least in May and June, while whooping-cough, most fatal in March, has almost disappeared by the end of October. Scarlet fever is almost as prevalent in the United States as in England, but whooping-cough and measles are not so diffused. It is a reproach to English sanitary care that the deaths of children from these diseases, dependant on direct infection in English towns, are double, and often much more than double, the returns from towns in France, Germany, and America, while those from typhoid fever are reduced to one-half, and from diphtheria to one-fourth of what they are abroad. During many weeks of this year, of nearly 4,000 deaths in German and English towns, we see in the former, measles causing from 30 to 80 deaths; whooping-cough, 50 to 70; scarlet fever, 50 to 60; and diphtheria, 150 per week. In our own towns measles has caused from 50 to 130 deaths in one week, with 104 in London only; whooping-cough, 70 to 170; scarlet fever, 80 to 107, with 60 in London; diphtheria, 15, with 8 to 11 in London; while in Paris, with half the London numbers, the weekly deaths from diphtheria have been 34 to 55, with only one death in each of those weeks from scarlet fever, and none from whooping-cough. In an average of 2,000 weekly deaths in American towns for the first four months of this year the numbers from diphtheria and croup average over 100; those from scarlet fever the same; whooping-cough 30, and measles 5. Small-pox once imported into New York was promptly arrested, and does not appear elsewhere. The registration of infectious diseases has been carried out during the last six years in New York; had no information of small-pox been obtained until the death of the immigrant had occurred, it would have been too late to stop the spread of the disease.

The population of New York exceeds one million. Scarlet

fever seems to exist permanently there as an epidemic, increasing in the autumn much as it does in London. The Brooklyn Board of Health endeavours to exclude from school all children of families where scarlet fever, diphtheria, measles, and whooping-cough exist. In August, when the public schools are closed, only 17 cases of infectious disease are reported; after the schools re-open this number is soon increased to 100, chiefly of scarlet fever. The greatest number of cases is registered in December; in the last week of January 216 cases were registered, and 184 in the first week of February; the mortality declined from 68 and 60 per week in January, to 50 and 44 in February; there are still 100 cases weekly. It is unlikely that all the cases of scarlet fever are registered, yet on comparing the returns of sickness and mortality in this disease some points of considerable importance in the history of scarlet fever appear that are probably true of several other epidemic diseases, viz., that the fatality is greater during the first extension of the disease than afterwards, so that a diminution in the number of deaths may actually be noted while the number of cases is increasing; and that with the decrease in the number of cases there is a still further decrease in the proportional number of deaths to cases. The highest mortality, instead of closely following upon the greatest prevalence of this disease or coinciding with it, actually precedes it; the registration of disease showing the epidemic to be really extending, while from the mortality returns it would appear to be subsiding.

The Michigan reports of sickness show this to be true for whooping-cough as well as for scarlet fever. Baker's diagrams give a curve for the prevalence of whooping-cough prolonged into the summer beyond that for its greatest mortality, just as the scarlet fever curve of sickness is continued beyond that which marks the proportion of deaths. This is not more than general expectation would receive as likely. Hitherto proof of it has been wanting; when revealed, a step is made towards eradicating these diseases, for surely this increase would not be allowed to go on in our midst without some means being adopted for checking the spread of infection; it is the slight cases that carry on the torch, and however mitigated the flame may have become, it will meet with some tender and susceptible

subjects to increase its energy, while they are themselves consumed by it, at any time of the year. We see all through the summer cases of slight sore throat with passing rash, attributed to chills and fatigue, which are often called rose-rash and never scarlet fever, yet are sometimes followed by dropsy, or produce severe illness in others, without scarlet fever being suspected, and while it is said to be quite absent from a district; the disease spreads without attracting notice until, meeting with a fresh series of the susceptible, another epidemic is originated. In the same way coughs, attributed to stomach derangements, are carried through the autumn till they make themselves recognised as infectious transmitters of whooping-cough.

Considerations of this kind point to the insufficiency of reports of sickness confined to those diseases only that are known to be contagious. It may be well that householders should give to the sanitary authority notice that certain illnesses exist in their houses, as they would give notice that their dust-bins required looking to. This is not the information required from the medical profession. Printed forms, returnable by post to the sanitary authority weekly or monthly, with the number of cases met with in that time, of certain ailments, among which such apparently trivial headings as colds, sore-throat, rash, diarrhoea, might advantageously take the place reserved for typhus and cholera, would be a valuable contribution to our means of judging of the public health. It might be compulsory on the paid medical officers of public dispensaries, charities, and poor-law unions, to make such returns; not on other practitioners. Where a return of all ailments is asked for there is nothing invidious in the report of those that are infectious; it is not even necessary that special cases of infectious disease should be indicated, unless in the opinion of the doctor there were circumstances in such case that required the intervention of the health officer; then it should be incumbent on the head of the family to co-operate; and compulsory powers need only be sought to compensate for indifference as to sanitary defects, or indisposition to remedy them on the part of the householder.

The use that can be made of a return of part of the sickness only in a large town is well shown by reports periodically issued

by M. Ernest Besnier for Paris. In his Report on the Mortality in the Hospitals and Hospices of Paris for the First Quarter of 1879, it appears that the general mortality, 3,716, exceeded the mean of the previous seven years by 589. This increase was largely due to the greater fatality of pneumonia, 261 deaths occurring in 554 cases, or 47·1 per cent., as compared with 36·3 of former years; partly also to an increase in some zymotic diseases, foremost among which is diphtheria, causing 529 deaths. The concurrence of diphtheria and pneumonia in Paris during the early part of this year is also shown. The mortality returns for pneumonia must include many cases of broncho-pneumonia; for of bronchitis the number of cases was 1,228, with 105 deaths, or 8·55 per cent., as compared with 6·15 in previous years, or an increase of only 2·4, due to the cold, damp season. The death-rates for phthisis and for pleurisy were below the average; of the latter there were 309 cases, with 30 deaths, or 9·9 per cent. only, as compared with 13·45 per cent.

In the hospitals 233 cases of croup occurred, of which 181 were fatal, a mortality of 77·68 per cent., which is the mean mortality of these cases for the same quarter of the preceding nine years. These cases must be added to those returned as diphtheria, making the mortality from this cause 710 for the quarter. Dr. Besnier insists on a simple and invariable law of the seasonal evolution of this epidemic; that "Every year the permanent epidemic of diphtheria attains the lowest point of its curve in the third quarter, rises again during the fourth, reaches its paroxysm during the first, and again declines during the second. We are always able, then, taking a general view of the epidemic, as I have done for several years, to announce the mean epidemic course of the succeeding quarter. More than this, we may also, by comparing the curves of several successive years, establish a strong presumption for a much more considerable space of time, and discern whether the curve which the disease describes through years is an ascending or descending one." The conclusion is that the diphtheritic epidemic in Paris is beginning to decline, and that "the generalised application of such results mathematically acquired would give to epidemiology, in all its parts, a precision of which it has always stood in need."

Something of this kind may already be possible with respect to scarlet fever; the variations of mortality in that disease have been already carefully studied. When to our knowledge of this is added a return of the cases that are occurring in any district, some guide is given, not only to the rise and fall of the epidemic, but as to the energy of the measures required for diminishing its extension, or for eradicating it altogether.

### AN EPIPHYTIC NEW TO EUROPE.

M. MAX CORNU recently submitted to the Academy of Sciences an interesting note on the appearance in Europe of a new epiphytic.<sup>1</sup> It would appear that the ordinary onion in the neighbourhood of Paris has been attacked by a peculiar disease which fills with a black powder the fleshy part of the scales of the bulb and the base of the leaves.<sup>2</sup>

The bulbs attacked, which belong to the precocious variety of the *White Onion*, and principally to the *Nancy Onion*, generally remain small; the black powder spreads to the exterior by the rupture of the epidermis, or else, inclosed in the tissues, it is observed under the form of grey spots more or less elongated or confluent. When a part only is attacked, the bulb there is less developed than elsewhere, indicating a local change solely.

A longitudinal cut shows that the black powder occupies the whole substance of the scales or the leaves; the presence of the parasite, apart from the degeneration caused by it, compromises the healthy aspect of the bulbs, modifying and changing their whiteness. This black powder, under the microscope, is seen to consist solely of an enormous number of spores, belonging to an Ustilaginei of the kind which Léveillé has distinguished under the name of *Polycystis*, and which has since been designated *Urocystis* (Raben-horst). They are of brownish-yellow

<sup>1</sup> *Comptes Rendus*, 7 Juillet, 1879, p. 51.

<sup>2</sup> Onions commonly suffer from several fungoid affections well known to cultivators, and little feared, e.g. (1.) *Peronospora schlideniana*, a species of fungus too tardy of development to be harmful; (2.) The *grease*, a special disorder which iquefies the bulb during wet seasons and on certain soils; (3.) A particular *Sphaeria* which produces circular black spots on the scales. This *Cladosporium* does not penetrate deeply, and appears to be without action on the plant.

colour, oval, polyhedral, with thick membrane, and surrounded by very numerous, diminutive, translucent, hemispherical cells, which cover them almost completely. This *Ustilaginei* appears destined to produce redoubtable consequences, comparable to those of the smut (charbon) of wheat, maize, and sorgho.

For the moment kitchen-gardeners do not seem to have given heed to this new malady.<sup>1</sup> The specific discrimination of the disease enables M. Max Cornu to affirm, subject to correction, that the parasite is new not only to France but to Europe. MM. Tulasne, in their remarkable memoir upon *Ustilaginei* do not mention it. More recently, 1877, M. Fischer, of Waldheim<sup>2</sup> (who had visited all the important herbaria of Europe), in his monograph of this family, notes this species as special to North America, adopting thus the conclusions of Dr. Farlow on the subject.<sup>3</sup>

Dr. Farlow first called attention to this parasite,<sup>4</sup> and described it under the name of *Urocystis Cépulæ*. The fungus has very recently made its appearance in America. Within the past twelve years only has it been making ravages in the States of Connecticut and Massachusetts, where the onion forms an important branch of culture. It has caused there losses to the extent of many thousand dollars yearly. At this period it was, according to Mr. Peck, an official botanist, and able mycologist, unknown in the State of New York. Dr. Farlow holds that this parasite has been derived from some wild plant. Liming of the seed and treatment of the soil have proved equally inefficacious against it, and it appears to be necessary, in order to get rid of it, to let the land lie fallow for four years. This species of fungus seems to have been assimilated wrongly to the parasite of *colchicum*,<sup>5</sup> which is occasionally, but rarely, met with in the suburbs of Paris.

<sup>1</sup> MM. Davillard and Laurant, and M. Curé and his brothers, able kitchen-gardeners and important members of the committee instituted for the study of diseases of plants (See *Comptes Rendus*, 18 November, 1878) had neither seen nor heard mention of the disease. <sup>2</sup> *Ann. des Sc. Nat.* 6 serie, t. iv. p. 237.

<sup>3</sup> *Twenty-fourth Annual Report of the Society of the Massachusetts State Board of Agriculture: Onion smut.* 1877.

<sup>4</sup> "The fungus, which is peculiar to America, has, as far as we know, never been described."—FARLOW, *loc. cit.*

<sup>5</sup> *Urocystis Colchici*, var. *Cepulæ*, Cooke (Royal Horticultural Society, Scientific Committee, *Garden Chronicle*, t. vii. p. 634).

This is not the first time that a new affection has come to us from America. Simply noting the *Phylloxera* and the *Doryphora*, insects differing much from others in their mischievousness, the *Oidium* of the vine, and the *Puccinia Malvacearum* (Monti), may be mentioned, the presence of which in Europe, M. Max Cornu states, was first made known by himself.<sup>1</sup>

"A new malady," M. Max Cornu remarks, "the issue of wild plants, is now implanting itself in European soil. Recently observed in America, from whence it comes to us, we should have data as to the point of departure of a precision such as have never before been obtained for parasites of this nature. It is probable that in a somewhat analogous fashion to that which has here been observed of the parasite under consideration, epidemic affections of every sort, of which the origin is regarded by some thinkers as mysterious and spontaneous, are maintained among groups of isolated beings and afterwards propagated."

<sup>1</sup> *Bulletin de la Société botanique de France*, séance du 13 Juin, 1873.

# THE PRACTITIONER.

OCTOBER, 1879.

## Original Communications.

### ON THE TREATMENT OF THE NIGHT-SWEATING OF PHTHISIS.

BY WILLIAM MURRELL, M.D., M.R.C.P.,

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(Continued from p. 199.)

#### IX.—Picrotoxine.

SEEING that pathological sweating might be arrested by Dover's powder, an agent extensively employed as a diaphoretic, I determined to turn my attention to other sweat excitors. Picrotoxine, the alkaloid of *Cocculus indicus*, naturally suggested itself. The first thing was to obtain it in a form suitable for administration. I procured a saturated solution in water, which, I was informed, was about 1 in 180. After a time some of the picrotoxine crystallised out, and I had to content myself with a weaker preparation. Mr. Martindale made me a 1 in 240 solution—a grain in half an ounce—and this keeps well and is convenient to work with. Next came the question of dose, and

here I had very little to guide me. Dr. Crichton Browne says,<sup>1</sup> "A twentieth of a grain of picrotoxine may be regarded as the minimum fatal dose in a rabbit weighing about three pounds; and one-thirtieth of a grain may be regarded as the minimum fatal dose for a guinea-pig weighing about a pound and a quarter." This was clear enough for rabbits and guinea-pigs, but threw very little light on the right dose to give to a human being; and I accordingly determined to proceed cautiously, keeping well on the safe side.

The next thing was to find a suitable case for its employment. For many months I had had under treatment a little girl suffering from Grove's disease, and for some time she had been very ill indeed. She had fallen away terribly, and was very short of breath. Her temperature in the middle of the day was nearly always over 100°, and her pulse 112 or more. Physical examination of the chest showed less than might have been expected, but there could be no doubt that active mischief was going on in the lungs. She had a loud apex systolic murmur, so loud, indeed, as to obscure the breath-sounds in front. For weeks past she had had profuse sweating night after night. "She was so hot at night," she said, "and her things were quite wet; it would lie on her face like beads." She was ordered a drachm of the 1 in 180 picrotoxine solution in eight ounces of water, the dose to be a teaspoonful. The mother was told to give a teaspoonful of the mixture the first night, then, if it did no good, two teaspoonfuls the next night, and if that failed, she was to go on to a teaspoonful three times a day, then to two teaspoonfuls three times a day, and so on. She was an intelligent woman, and it was felt that she could be safely trusted. In four days they came again, the mother and the daughter, and this was their report:—The first night she was given a teaspoonful, and the perspiration was much less; the second night she had another teaspoonful, and there was less than the night before; the third night she took another dose, and there was hardly any at all; the fourth night the medicine was not taken, and there was no return of the perspiration. They were then told to use the medicine only if necessary, and

<sup>1</sup> *British Medical Journal*, April 10th, 1875.

it was left to the mother's discretion how often it should be given. Three days later they were seen again, and reported that on the fifth night, no medicine having been taken, the perspiration was very bad indeed; on the sixth night the patient took a dose and there was much less; whilst on the seventh night no medicine was taken and the skin was comfortably moist—nothing more. The medicine was discontinued and there was no return of the perspiration for eleven days, when she had it severely on two consecutive nights. A single dose again checked it, and ten days later she reported that there had been no return. The mixture was tasteless, was taken without difficulty, and produced no ill effects of any kind.

In the second case the picROTOXINE succeeded admirably. The patient was a young man of nineteen, with dulness and flattening at the right apex, and bronchial-breathing. He had had night-sweating for a fortnight, almost every night. It generally came on about twelve or one o'clock, and kept him awake till daylight. He was very wet, his flannel shirt was saturated, and often his night-shirt was damp too; he was "just as if he had been washed." He was ordered the same mixture as in the previous case, a teaspoonful of the saturated solution in eight ounces of water. The first night he took a teaspoonful at bed-time, and was no better; the second night he took two teaspoonfuls at bed-time, and noticed some improvement; the third night he took three teaspoonfuls and perspired very little indeed; the fourth night he took four teaspoonfuls and was quite dry; he slept better, felt more refreshed in the morning, and was stronger and brighter all the day. The medicine was then discontinued, and there was no return for a fortnight, when he was sent in the country.

The third patient was a policeman, aged 23, with a cavity at his right apex. He looked weak and ill, and had had profuse sweating for five or six weeks. Sometimes it would run off him almost in streams. He was ordered the same mixture as the other patients. The first night he took a teaspoonful at bed-time and sweated as much as ever. The next day he took three doses, the last at bedtime, and that night there was a marked improvement. The next day he took four doses, and was better still. The fourth day he took five doses, and that night was quite

free from perspiration. He was brighter and better in every way. The medicine was then discontinued, and the following week he was quite free from perspiration, except a little one night. A week later he reported that there had been a little sweating at bedtime, but not enough to cause him any inconvenience. He was ordered a drachm of 1 in 240 picrotoxine solution in eight ounces of water, a teaspoonful to be taken every four hours. In two days the perspiration had completely ceased, and a fortnight later he reported that there had been no return. By the arrest of the sweating he improved in every way, and was enabled to return to duty.

Another marked case was that of a man, aged 25, who played the cornet in a popular troupe of nigger minstrels. He had consolidation at the right apex, and a few days before he came under treatment brought up nearly a pint of blood on the stage, half filling his instrument. The sweating usually commenced early in the evening, and often enough after he had "blacked up" for business it would wash half the black off him again. He usually got home about eleven, and was often in bed and asleep by half-past. About two in the morning he would wake up wringing wet. This had been going on for two or three months, and it had weakened him terribly. He had to play for his bread; had he thrown up his engagement, he and his wife must have starved. He was most anxious to have the sweating stopped. He was ordered the picrotoxine mixture in doses increasing from a teaspoonful to a tablespoonful at bedtime. In four days the sweating had practically ceased. In a week it returned, but was checked again in three nights by the same treatment.

These are not picked cases in any way. They are taken in the order in which they came. I have employed this mode of treatment for checking the excessive perspiration of phthisis in twenty cases—10 men, 7 women, and 3 children—and have had only one failure. The youngest patient was a boy of 8, and the oldest a man of 45. One woman certainly looked older, but she said she was only 38. Usually the drug was given at bedtime only, but sometimes a dose was taken three or four times a day. The plan of giving it solely at bedtime answers admirably. In a case where two drops given four times a day

afforded only partial relief, five drops at bedtime effected a speedy cure. As a rule there is no improvement the first night, but on the second night the perspiration is less, and by the fourth night it has practically ceased. A great advantage of this treatment is, that it does not make the skin too dry; it leaves it comfortably moist, whilst not unfrequently atropia seems to parch it up. It is not uncommon to hear patients who have been taking the picrotoxine say that the perspiration has not quite gone, but is not bad enough to take medicine for. As a rule the sweating comes back in about ten days, or from that to a fortnight, necessitating a return to the treatment for a few nights. In the same patient I have frequently checked the perspiration with picrotoxine on three or four different occasions. In this way the opportunities of watching the action of the drug have been considerably multiplied. In one case picrotoxine succeeded admirably after oxide of zinc and Dover's powder, each given for a week in ten-grain doses at bedtime, had failed. All the patients were out-patients, and all stages of the disease were represented.

I have had only one case of failure out of the twenty, and even there the remedy did some good at first. The patient was a young woman of nineteen, with coarse crepitation all over both lungs. She had had sweating at night for four and a half months, every night. It would come on between eleven and twelve o'clock, as soon as she got to bed, and it would make her things quite wet. She was ordered gr.  $\frac{1}{150}$  of the picrotoxine every four hours. The first night after two doses she was no better; the second night the perspiration was less, whilst the third night there was none at all. Camphor water was then substituted for the picrotoxine, and five days later the perspiration returned "as bad as ever," and continued for six nights. She was then ordered gr.  $\frac{1}{80}$  every night at bedtime, and four days later she reported that there had been no improvement. She was then ordered gr.  $\frac{1}{120}$  four times a day, which was taken for three days with very little benefit. The dose was then increased to gr.  $\frac{1}{80}$  four times a day; but it did her no good. She was wet through night after night, and "the medicine did not help her a bit now." She was very weak indeed; could hardly get about, and her cough was very bad.

I did not feel justified in keeping her longer on the picrotoxine, so gave her pilocarpine, which promptly checked the sweating.

I also used the picrotoxine mixture in the case of an asthmatic who perspired profusely during his paroxysms. It had no influence on either the shortness of breath or sweating. *Grindelia robusta* subsequently arrested the attacks, and with them the sweating.

(*To be continued.*)

## ON THE RELATIVE ACTION OF DUBOISIA AND ATROPIA.

BY SYDNEY RINGER, M.D.,

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SINCE Mr. Tweedy first brought *Duboisia myoropoides* to the attention of the profession in England the alkaloid has been largely used as a topical application to the eye, in a solution corresponding to the officinal preparation of sulphate of atropia, namely, one grain in 120 minims. This application has caused many unpleasant symptoms. In one case under my care the *duboisia* caused much weakness, depression, and giddiness; he felt as if he were drunk. Another patient said it causes "great discomfort in my stomach, and a feeling as if a huge lump was in my throat. My power of distinguishing one article of food from another by the taste is taken away." In this patient it also caused great giddiness.

These accounts led me to test with the assistance of Mr. W. H. Neale the relative action of sulphate of atropia and sulphate of *duboisia*.

We first administered by the mouth a dose of sulphate of *duboisia*, and carefully noted the symptoms, and we then, on a subsequent day, gave a corresponding dose of sulphate of atropia.

On one occasion we gave two doses of  $\frac{1}{16}$  grain of sulphate of atropia at an interval of two hours. On five occasions we gave  $\frac{1}{16}$  grain.

*Duboisia*, we find, produces identically the same symptoms as atropia, but is far more powerful than atropia.

After duboisia, the symptoms begin in about half an hour, and reach their height in about two hours. The earliest symptom is dryness of the mouth.

After  $\frac{1}{120}$  grain, there occurred great dryness of the mouth; dilatation of the pupils; much giddiness, almost preventing walking, and increased by exercise; slight drowsiness and rambling; great weakness, so that the limbs felt heavy and were raised obviously with considerable difficulty, with so much difficulty, indeed, that the woman could scarcely feed herself, and her grasp was very weak. It produced flushing of the face, and on one occasion patchy erythematous redness, the skin at these places being rather swollen and hard. The pulse became much fuller and rather slower. These symptoms lasted about seven to eight hours.

The same dose of sulphate of atropia only produced slight subjective dryness of the mouth.

After the administration of  $\frac{1}{60}$  grain in two doses, with two hours interval, we observed the same symptoms for the most part. The man became very drowsy and delirious; his delirium was of the busy kind, he incessantly tried to pick up imaginary things from the floor. He had also decided twitchings of his limbs, and his pulse rose from 84 to 120, and his respirations from 18 to 30 per minute. The symptoms left him in about ten hours. The  $\frac{1}{60}$  grain of atropia, on a subsequent day, only caused subjective dryness of his mouth.

These observations confirm my previous observations, published in the *Lancet* for 1878. I then found that duboisia, in addition to the symptoms above detailed, causes headache, checks perspiration, antagonizes the action of muscarin on the heart, and produces late tetanus in frogs—effects it possesses in common with atropia.

Duboisia, then, possesses the same properties as atropia, but is far more powerful than atropia. Mr. Tweedy found this to be the case in regard to the local application to the eye. But whilst duboisia is far more powerful than atropia on man, the reverse is the case in respect to frogs.

I injected hypodermically  $\frac{1}{4}$  grain of sulphate of duboisia under the skin of a frog weighing 21 grammes. In 25 minutes the frog was a little weak; this weakness progressed, bu

was always far from complete, and disappeared entirely in five hours. Throughout the experiment the heart beat well at 48.

The same dose of sulphate of atropia given to a frog weighing 19 grammes caused complete paralysis in 25 minutes, persisting more than eight hours. The heart fell to 24 per minute, and became very weak, and breathing was arrested.

In another frog, weighing 22 grammes, we gave  $\frac{4}{5}$  grain of sulphate of duboisia. In an hour the frog was so weak it could only just crawl. It recovered completely in three hours. The heart beat strongly throughout the experiment at 36 per minute, and the breathing never ceased.

We gave the same dose of sulphate of atropia to a frog of the same weight. In an hour the frog was completely paralysed, and nine hours afterwards the animal could not crawl. In 24 hours it had recovered, but was slightly tetanic. The heart fell to 20 and became weak, and the breathing ceased.

Atropia, therefore, paralyses far more powerfully the motor nervous system, the heart and respirations, in frogs than duboisia.

## GLYCERINE IN THE TREATMENT OF HÆMORRHOIDS.

BY DAVID YOUNG, M.D.,

*Florence.*

IN the excellent contribution to the treatment of hæmorrhoids by Dr. Atkinson in the *Practitioner* for August reference is made to my paper on the use of glycerine in their treatment, which appeared in the *Practitioner* in January, 1878. Dr. Atkinson inclines to the belief that the action of glycerine in these cases is indirect, and that its therapeutic value is limited to its aperient or laxative action. I do not know whether this opinion is based upon a fair trial of the remedy in question, but my own further experience of it leads me to believe that glycerine has something more than a merely aperient value in the treatment of hæmorrhoids. Of course, in a great number of the cases, especially in the more chronic forms, the cure is only palliative, the relief temporary; but even this is a gain in those cases of feeble health in which one would hesitate to have recourse to operative measures. During the past eighteen months I have used glycerine frequently in hæmorrhoidal cases, the results of which may be interesting to the readers of the *Practitioner*.

Instead of Dr. Atkinson's classification of hæmorrhoids into

Acute,  
Sub-acute, and  
Chronic,

I would suggest the following as being both more strictly pathological and affording a simpler clinical guide, as to treatment, viz. :—

1. External hæmorrhoids, and
2. Internal hæmorrhoids.

1. *External Hæmorrhoids*.—In examining the anus it will be found that in nine persons out of every ten there are little tabs of withered-looking skin varying in size from a millet-seed to a kidney bean, and of the existence of which the majority of the persons examined were unaware. These are the remains of old external piles, and while they remain in this state are perfectly harmless, but when they become inflamed the pain is very acute, far exceeding any pain ever felt in the ordinary forms of internal piles. They never bleed, and hence are sometimes termed *blind piles*. They become active and painful, not so much from derangements of the portal circulation as from external causes, as for example, sitting, while warm and perspiring, on a stone or other cold seat. I have known cases arise from driving on the outside of a coach on a cold morning. On examination, when in the inflamed state, these external hæmorrhoids have the appearance of small glistening tumours, of a pinkish colour, exquisitely painful to the touch, and situated close to the edge of the anus: sometimes partially within it. The speediest relief is obtained by slitting up the tumour and evacuating the clot of blood which it contains, but, as all physicians know, the proposal to treat them in this manner is a harder matter than the more gentle one by medicinal means. In these cases aperients as a rule are positively injurious, and generally speaking are less frequently called for than in cases of internal hæmorrhoids. Of all the plans which I have adopted none have yielded such satisfactory results as the following, viz. :—

To bathe the part thoroughly with water, as warm as can be borne, together with the free use of Castile soap, and afterwards to apply equal parts of the compound gall ointment and extract of belladonna. The operation must be repeated every three or four hours till the pain subsides. Usually the first application gives great relief. Without the previous bathing with soap and warm water the application of the ointment is of little service.

2. *Internal Hæmorrhoids*.—These are of various kinds—arterial and venous—and are normally situated within the anal ring. They may be found in all stages as regards their formation, size, and the degree of suffering to which they give rise. In every case their origin is connected with some disturbance of the portal circulation, and is not so much affected by external

conditions as is the case with the external variety. Unless the tumours are strangulated, or their surfaces ulcerated, they never give rise to the same acuteness of suffering as blind piles. They are also much more amenable to the influence of medicinal measures both internally and locally. The immediate object of treatment in these cases is twofold—

(a) To relieve congestion of the portal circulation, but more particularly to correct the sluggishness which leads to it; and

(b) To soothe the irritated parts.

No doubt in a case of well-marked venous internal hæmorrhoids some temporary relief may be obtained by the prudent use of the so-called hepatic stimulants—podophyllin, euonymin, and mercury—not from any stimulant effect which they possess over the liver so much as by sweeping away the bile as fast as it flows into the duodenum, and thus preventing its absorption; but sometimes they entirely fail. A second stage may now be said to be reached in the treatment of such cases, and here it is where glycerine appears to be singularly beneficial. The following are given in illustration:—

(1.) M. S., æt. 27; phthisical: Has suffered from large internal venous hæmorrhoids for upwards of two years. At times they bleed profusely, which relieves her; at other times the distress they occasion is so great that she is obliged to remain in bed for days together. For a week during one of her attacks I examined her motions daily, and found them natural in colour and consistence. She had seldom suffered from constipation. She was ordered a dessert-spoonful of Sargo glycerine twice a day, and in two days experienced great relief. She continued taking the glycerine for two weeks, and after taking it for five or six days the bowels became slightly constipated. The same thing occurred during two subsequent attacks, and was easily counteracted by taking at bedtime a powder composed of

Sulphur, 10 grains.

Sulphate of potash, 10 grains.

(2.) Mrs. T., æt. 45: Has suffered from internal piles for many years. They used to "come down" upon the least exertion, and otherwise caused her much discomfort. Bowels always regular. Sometimes a second motion at bedtime. She began

to take the glycerine last October and soon felt much better. She had less discomfort in the rectum, and could take a fair amount of exercise without their "coming down." She continued to take the glycerine for ten days before the bowels appeared to be affected by it. The bowels then become somewhat confined, when she took the powder of sulphur and potash which produced no effect. The dose was increased to 15 grains of each with the desired result. Mrs. T. is now troubled much less frequently than before, and when she is, the glycerine never fails to give her relief.

The two following cases were complicated with constipation, and an aperient more powerful than the sulphur powder was necessary to maintain a regular action of the bowels.

(3.) C. S., æt. 51 : Has lived many years in the tropics, and all his life has been more or less troubled with piles. Four years ago he underwent an operation for their removal. For more than a year the operation afforded considerable relief, but during the last two years his condition has been much worse. I saw him in March last, and on examination found two large venous hæmorrhoids, one situated posteriorly, and the other on the right side of the rectum. He was then taking a "Cooper's" aperient pill every night to relieve the bowels. I ordered him a dessert-spoonful of Sargo glycerine twice a day, and the "Cooper's" pill to be continued. In a week he was considerably better. A month later he reported himself very much better, but that the bowels were rather confined. The following pill was substituted for the one he was taking :—

R Hydrarg Bichlor., gr.  $\frac{1}{30}$ .

Strychniæ, gr.  $\frac{1}{30}$ .

Ext. Belladonna, gr.  $\frac{1}{3}$ .

Quiniæ Disulph., gr. 1.

Ext. Aloes Barb., gr.  $\frac{3}{4}$ . Misce.

F. Pil. One to be taken at bedtime.

He continued the pill and glycerine for about six weeks, and when I examined him in the middle of June the posterior pile was shrivelled away almost to the size of a split pea, while the other was scarcely double that size. The bowels act daily

without any discomfort, and he has now almost forgotten that he had ever been troubled with hæmorrhoids.

(4.) M. A., æt. 30, American: Had a bad attack of piles before leaving home, and another after his arrival in England. They were removed by ligature last February in London, but after two months' stay in Paris, they returned slightly, and gradually increased—no doubt aggravated by almost incessant travelling, inattention to diet, &c. He arrived in Florence in May. When I first examined him I found two medium-sized venous piles, the surface of one of them being very much abraded, and one small arterial tuft apparently occupying the site of the operation. The bowels were constipated; the motions consisting of several hard dark-coloured pieces about the size and shape of a walnut. He was ordered to take glycerine twice a-day with the sulphur powder at bedtime, and to bathe the parts well with the following lotion:—

Solution of Acetate of Lead, ʒij.

Fresh Milk, ʒij.

Warm Water, ʒj. Misce.

He obtained almost immediate relief, but after several days the bowels became more confined, in spite of the sulphur and potash. He now commenced taking the tonic aperient pill mentioned above, with a successful result. The motions became regular and of a good consistence, and the hæmorrhoids gave scarcely any trouble.

I think a careful consideration of these cases will show that any benefit received from the use of the glycerine is not due to any aperient action it may be supposed to have. Indeed my experience points the other way. In not one of the cases mentioned did it appear to have any aperient action at all. I have at this moment under my care a phthisical lady who takes glycerine in full doses, three times a-day (she cannot take cod-liver oil), without the slightest laxative effect upon the bowels. Also a gentleman who has been many years in India, where he suffered frequently from diarrhoea, who takes glycerine instead of sugar, regularly, without any aperient effect whatever.

I am anxious also to call attention to the action of aloes as

an aperient in these cases. Out of between thirty and forty cases treated as above, and as many more treated for constipation alone, I have only found one in which aloes seemed to increase the hæmorrhoidal trouble. When it is combined with belladonna and quinine, or belladonna and nux vomica, it rarely, as far as my experience goes, causes any trouble in the rectum.

I would only further suggest that much may be done preventively in these cases, and nothing is more useful in this direction than the free use of cold water *immediately* after each action of the bowels. When the hæmorrhoids are inflamed warm water is generally more agreeable and soothing, but when they are in a chronic state—giving little or no trouble—the free use of cold water in the manner presently to be described, will not only be a source of much comfort, but greatly lessen the frequency of the attacks. Not only is there a great deal of neglect in the matter of personal cleanliness, in the present day—at least as far as the bowel is concerned—but many to whom this charge would not apply, equally fail from want of proper knowledge as to the manner in which the lower bowel ought to be bathed. When the question is put, “Do you carefully attend to bathing the rectum every day?” the answer invariably given is “Yes;” but when you inquire more particularly, you find that it is done during the ordinary bath, before the bowels have been relieved, or at some other time having no relation to the hour of defæcation. This is where the mistake lies. The moment when the application of a cold sponge to the bowel is of so much value in preventing the formation of piles and in giving relief when they are present, is just the moment *after* the motion has passed. At the instant of the passing of the motion a partial eversion of the lower bowel takes place, and any hæmorrhoids which may be lying on its surface come down with it. If paper is used, as is so universally done, in order to cleanse this portion of the rectum, the sensitive mucous lining shrinks from the rough touch of the paper, and the everted portion returns to its place only partially cleansed, and having adhering to its surface particles of fæcal matter which keep up a constant irritation, giving rise to great discomfort even when no hæmorrhoids exist.

In cases of hæmorrhoids, fistulæ, and ulceration, when I have

had occasion to examine the rectum just after a motion had been passed, I have been greatly struck by the amount of fæcal matter which was found covering the surface of the sphincters ; sometimes completely obscuring a tender ulcer or other abraded part, affording a ready explanation why rectal sores are so intractable in the hands both of the physician and surgeon. I invariably prohibit the use of everything but the wet sponge. If the patient is very sensitive the application of cold water to the lower end of the bowel will sometimes cause colicky pains in the abdomen, in which case I advise tepid water, at least to begin with. All that is necessary is a little vessel about the size of a tumbler, having a lid which fits tightly, and a bit of sponge. The vessel, filled with water, is taken into the closet, and the soaking sponge freely used the moment the motion has passed. Instead of the mucous membrane shrinking from contact with the wet sponge, it appears rather to be soothed by it, and therefore the everted portion of the rectum is thoroughly cleansed before it returns within the bowel. Many have objected to this simple plan that it is troublesome and difficult to manage ; but of all those who have adopted it not one but has given the same testimony, viz., that of the great benefits which they have derived from it.

## COTO BARK IN THE DIARRHŒA OF PHTHISIS.

BY J. BURNEY YEO, M.D.

It is now more than two years ago that my friend Dr. Frank, of Cannes, suggested to me the use of coto bark in the treatment of the graver forms of diarrhœa which occur in the course of phthisis. Whatever difference of opinion may exist as to the desirability of attempting to arrest the less severe forms of diarrhœa, which we encounter in early phthisis, no one can doubt the value of a remedy which will help us to control the grave and exhausting attacks of diarrhœa which occur in its more advanced stages. I am persuaded that we possess such a remedy in coto bark, and I express this opinion with all the more confidence because it has not been arrived at hastily, but represents the observation and experience of more than two years.

During this period I have given it in many cases of apparently uncontrollable diarrhœa, that is to say, cases of diarrhœa which were not controlled by the ordinary remedies, such for example, as opium, bismuth, tannin, ipecacuanha, &c., and I have found it almost invariably have the effect of arresting the intestinal flux, and of relieving intestinal pain and irritation in a very short time. I say "almost" invariably, for when I first gave it I found no such good result, and on inquiry I found that one of my colleagues had employed it also without effect. This led me to consider the mode of its administration. I found my colleague had given it mixed with other substances and made into pills, and I had given it, in the first cases in which I tried it, blended with the *Mistura Cretæ* of the *Pharmacopœia*. It is deserving of notice that when given in both these forms it appeared inert; and one might have been induced to hastily discard it as a drug

without remedial value. This is probably the fate of many valuable medicines which appear to fail ; not from want of virtue in themselves, but from want of patience and attention in their mode of administration.

Finding that the fluid extract contained a resinous element which was precipitated in tough masses when the extract was carelessly mixed with water. I had the following mixture carefully prepared :

Fluid extract of coto, 60 minims.

Compound tincture of cardamoms, 60 minims.

Mix these together and triturate them slowly with mucilage of acacia, 3 drams, and simple syrup, 2 drams.

Finally add water to 6 ounces.

A tablespoonful of this mixture is a dose. In this form it is an opaque mixture, with a not unpleasantly warm and aromatic taste. I have usually found two or three doses of this mixture arrest or check the severest forms of phthysical diarrhœa.

The bark is imported from Bolivia in South America, and the preparation I have used is the fluid extract prepared by Ferris & Co., of Bristol. The dose is from 5 to 8 minims. An alkaloid *cotoïn* has been prepared from the bark, and is reported to have the same valuable properties as the extract of the bark itself, but of that I have no personal knowledge.

I may add that I suggested its use in a case of exhaustive and uncontrollable diarrhœa in one of the graver forms of exophthalmic goitre, which I saw in consultation with my friend Dr. Channing Pearse, of Brixton ; and he has since informed me that it not only arrested the diarrhœa, but also appeared to have a remarkable influence in allaying the distressing nervous phenomena associated with the case. I am quite sure that coto bark is a valuable remedy which ought rapidly to come into general use.

## AUTOMATIC AND OTHER MEDICAL ELECTRICITY.

BY FRANCIS IMLACH, M.D., M.R.C.S.

*Liverpool.*

TAKE a hemiplegic patient, and by automatic electric arrangement, make him raise the dragging limb as he walks, and stand as firmly upon it as upon the other; or make a paraplegic patient, in whom, for the present, walking is out of question, rhythmically flex and extend his limbs by alternating electrification of his flexors and extensors—you do more than merely electrify the paralysed muscles, his expectant attention is directed in turn to each moving limb, and an effort of the will is aroused as the oppressive sense of habitual inability is removed.

In the ordinary treatment of paralysis, *e.g.* of the calf of the leg, the limb is placed upon a chair and the calf is industriously rubbed with galvanic or Faradic rheophores. At first, perhaps, the heel is raised by contraction of the gastrocnemius and soleus, but soon the heel trembles and is no longer raised so high, though the current be still applied in its original strength; for power to contract is distinct from power to remain contracted, and fatigue quickly supervenes in a paralysed muscle, as is graphically demonstrated in Diagram 1, taken as follows:—

“A woman, aged 62, had a “stroke” with complete left hemiplegia of face, arm, and leg, together with loss of power of articulate utterance. Seven weeks later the lower limb had almost completely recovered under treatment, but the left arm and side of face were still paralysed. The left elbow was made to rest upon a table, and to the wrist was tied a silk thread which raised a lever so arranged as to write a much diminished

record of movements of the biceps on a revolving cylinder. Two rheophores were tied over the biceps, and a key inserted in the circuit of an induction current. In the first place the current was cut off by the key as soon as the muscle had completely contracted, and only reapplied after the wrist had dropped upon the table. But next, the current was allowed to continue to flow after full muscular contraction with the result shown in

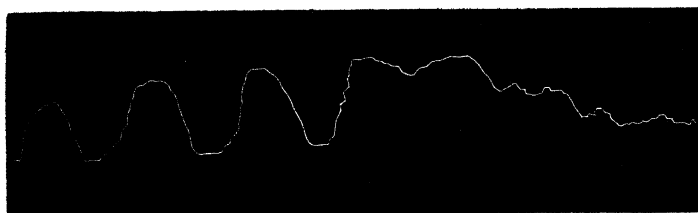


DIAGRAM 1.—Tracing from paralysed biceps.

the irregular tracing to the right of the diagram—the biceps, trembling, passed into almost complete relaxation. Adding a weight to the forearm gave a tremulous tracing during both dynamic and static contraction; in other cases the weight of the forearm itself is sufficient.

Diagram 2 is a similar tracing from a healthy but over-weighted biceps which raised twenty-one pounds (without the

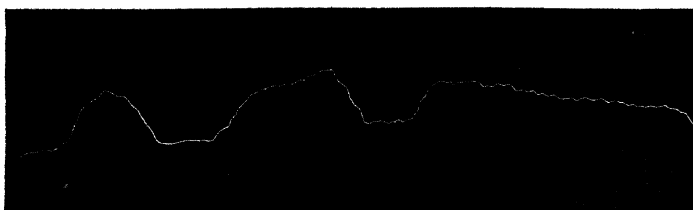


DIAGRAM 2.—Tracing from healthy but over-weighted biceps.

intervention of an electric current) several times rhythmically, and then attempted to keep them raised. A comparison of the two diagrams suggests the value of alternations of rest and motion, by passive exercise, when necessary, with simultaneous electrification of the appropriate muscles.

The apparatus by which this method may be carried out I have used occasionally during the past two years, and for several

hours daily during the past three months, by kind permission of Dr. Gee, amongst the numerous patients in the hospital of the Liverpool Workhouse.

*Rheophores and Wires.*

The rheophores are made of thin brass or block-tin, with binding screws attached. They are covered with wash-leather, and are tied to the trunk or limbs.

*a.* A flat piece of thin flexible metal three inches long by one and a half wide, forms a rheophore to the brachial and lumbar enlargements of the spinal cord.

*b.* A band two inches long by a half wide, serves to cover the muscles of the arm of adults, and of the lower limbs of children.

*c.* A similar band, five inches long, by a half wide, is a useful size for the muscles of the adult lower limbs.

*d.* A brass cup, three-fourths of an inch across, is employed where a nerve is to be electrised.

One of the first sort, and in ordinary two of the others, but sometimes four of *b* and *c*, are required.

Often very convenient for preventing confusion by numbers of wires, is what is known as telephone wire, namely, two lengths of thin copper wire separately insulated by cotton, and then bound together by the same material.

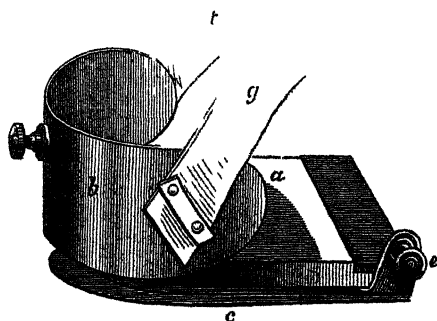


DIAGRAM 3.—Electric Sandal.—*a*, flat piece of boxwood ; *b*, brass rim riveted to *a* ; *c*, brass plate riveted to anterior edge of *a* ; *d*, *e*, binding screws ; *f*, *g*, straps.

*Electric Sandal.*

To a piece of boxwood (*a*, Diagram 3) the shape and size of the heel of a shoe, and about one-sixth of an inch thick, a

vertical rim of brass (*b*) rising an inch high, is attached posteriorly, as in the ordinary roller skate. A thin sheet of brass (*c*), shaped like the boxwood, is rivetted to the latter along its *front* edge, and is so sprung that the two remain open like a dead oyster until the wearer rests his weight upon the sandal, when metallic contact is made posteriorly. Slight pressure, as when the leg drags along the ground, is not sufficient to make contact. A binding screw is attached at *d* and *e*, and the straps *f, g*, buckle the sandal to the shoe of the wearer.

Diagram 4 is an example of its application in paralysis of the *left* hamstring and calf muscles. The sandal is strapped (over

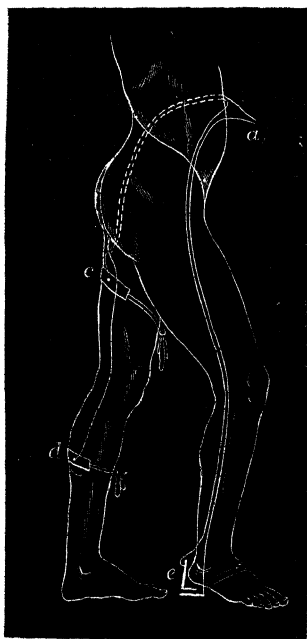


DIAGRAM 4.—Sandal applied in a case of *left* Hemiplegia.—*a*, wires from battery *c*, sandal; *c, d*, rheophores tied over left hamstring and calf muscles.

the shoe) to the *right* foot. One rheophore is tied so as to overlap the left biceps, semitendinosus and semimembranosus muscles, while another overlaps the gastrocnemius and soleus. A suitable length of telephone wire passes up one leg and down the other (under the clothes), and is attached by one pair of termi-

nals to the two binding screws of the sandal, and by the other to the binding screws of the rheophores. At its middle, one of the wires is bared and cut; and the two ends are attached to a small portable French induction coil, or by means of a couple of binding screws screwed into a slip of boxwood to the terminals of a few yards of telephone wire, the other terminals of which communicate with a stationary induction current, or galvanic battery. The long wire may be slung over a gaselier, or pulley, with weight attached to keep it out of the way. The patient then, with or without assistance, attempts to walk, and the battery is set in action. The walk is continued for a quarter of an hour or twenty minutes, and is repeated daily, or several times a week.

In the position indicated no current is passing, for the right foot is off the ground; but as soon as it is set down contact is made, the muscles of the left leg are electrised, and the limb is drawn up more or less according to the irritability of the muscle and the strength of current. In due time the right heel is raised; the left leg no longer receiving the current swings forward and is planted on the ground; and so, in succession, as each step is made. It might be thought, before trial, that the attendant pain would prevent patients walking, but experience has shown that such is not the case, even less pain being felt than when the leg is placed on a chair and the same strength of current applied.

When it is desired that the forward swing of the paralysed leg should be assisted, a rheophore is placed over the lumbar enlargement of the spinal cord, *i.e.* over lower dorsal and first lumbar vertebræ, and connected directly (through one of the long pair of telephone wires) with a positive galvanic pole or terminal of a coil. The wire from the negative pole, or other coil terminal, passes down to one binding screw of the sandal, and a wire joins the other binding screw with a cup-rheophore tied over the anterior crural nerve of the opposite side in the groove of the iliacus internus muscle.

To electrise the extensor muscles while the paralysed limb bears the weight of the body the method shown in Diagram 5 is used. Here the *right* limb is the paralysed one, and the sandal is strapped on the *right* foot. A rheophore is tied over the *right* quadriceps

extensor group of muscles, and a cup-rheophore over the external popliteal nerve just behind the head of the fibula. A length of telephone wire is attached by one pair of terminals to the coil, and by the other to the two binding screws of the sandal. One of the two wires is cut, and each end attached to a rheophore. Clearly, while the foot rests upon the ground, the quadriceps group, the extensor longus digitorum, tibialis

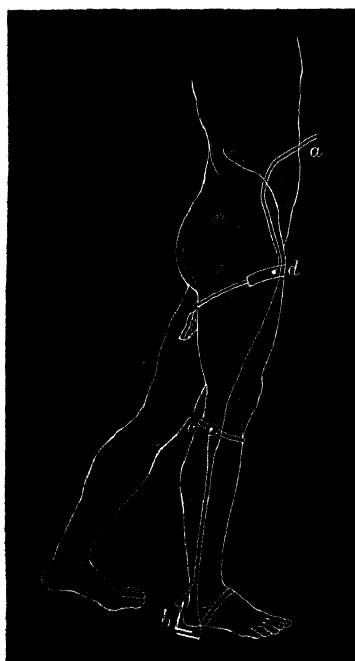


DIAGRAM 5.—*a*, wires from battery ; *b*, sandal ; *c*, cup-rheophore over external popliteal nerve ; *d*, rheophore over quadriceps extensor cruris.

anticus and peronei are contracted ; but when it is raised the current ceases. When a patient chiefly complains of the knee-joint giving way under him, a rheophore directly connected with the coil is tied over the lower dorsal spine. The other wire from the coil, after passing through a sandal strapped to the paralysed limb, is attached to two rheophores encircling the right hamstring and quadriceps muscles. And when the ankle-joint seems the weakest part, the rheophores are made to cover the muscles of

the calf, the extensor longus digitorum, tibialis anticus, and peronei.

A pair of sandals may occasionally be worn in paresis of both limbs, but in ordinary it is better to treat one leg at a time on alternate days. In locomotor ataxia, however, a pair is advantageous. Diagram 6 gives the arrangement carried out twice a week for many weeks with considerable success in an ataxic

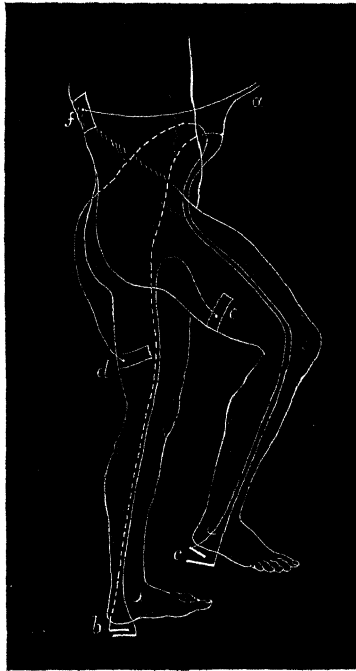


DIAGRAM 6.—Pair of Sandals applied in Locomotor Ataxia.—*a*, wires from battery; *b* and *c*, sandals; *d* and *e*, rheophores tied over both hamstring groups of muscles; *f*, rheophore tied over region of lumbar enlargement of spinal cord.

man aged 38. Dimness of vision and ataxia had existed for about eighteen months; the jerking movements were somewhat lessened, and the shooting pains greatly relieved.

A spinal rheophore was connected with the negative pole of a galvanic battery of twenty-five cells. A wire, joining the two sandals, was connected at its middle with the positive pole, and from the second binding screw of each sandal a wire passed to a rheophore on the hamstrings of the opposite side.

CASES.—A girl, aged 14, had fever six years previously, after which the left leg became partially paralysed. It is now cold, weak, two inches shorter than the other, and two and a half less round the calf. Treated with sandal and induction current twice a week for two months. *Result*.—Calf was increased an inch and a half, and the leg is proportionally stronger.

An unmarried girl, aged 25, had a healthy confinement in August 1878, in January 1879 suffered from bronchitis, and on 5th February lost the use of her left leg, and has since remained unable to walk; the knee has been blistered, and the magneto-electric current applied almost daily in the ordinary way without beneficial effect. 9th July.—Left leg cold, apparently complete paralysis of the gastrocnemius and soleus, which are somewhat shrunk, and react imperfectly to the induction current; anæsthesia up to the knee, pricking with a pin and pinching are not felt; there is a slight mitral murmur. A sandal was applied to the right foot, and rheophores to the left calf; a strong induction current was used, and the patient, with two assistants, attempted to walk. 19th July.—This treatment has been repeated every other day for twenty minutes; sensation has returned to the limb which also no longer feels cold, and the patient can walk alone while the battery is applied, and for a short time without it. 21st July.—Walked without assistance down a flight of stairs and up again with her baby in her arms. 1st August.—Treatment discontinued; the left leg is now as strong as the right, but the gait is waddling owing to weakness of the muscles of the back.

Woman, aged 33, six years ago had great pain in left knee, and for a time was unable to walk; in February 1878 had right hemiplegia, which came on, she says, gradually and without loss of consciousness. June, 1879.—Atrophy of both disks, arm completely paralysed, can walk, but with great difficulty, dragging the right leg after her. Seven applications on alternate days of the galvanic current and sandal (the position of the rheophores being occasionally changed—one usually over the dorsal spine) greatly improved her walking; and the arm also, under treatment hereafter to be described, recovered some of its power.

I might add several instances of old aphasia and right hemiplegia treated with like result. Permanent cerebral lesion

prevents complete recovery, but seldom prevents some improvement of muscular power. To be able to walk with something like equal step, to pull the arm out of the sleeve, to dress, to hold a book or knife however feebly, are advantages which can be gained, in some cases, only by months of treatment.

### *Electric Treadle.*

To avoid difficulty and fatigue in the treatment of paraplegia of adults, I have had a fly-wheel constructed with such fittings that simply turning a handle rhythmically exercises both limbs, and simultaneously electrises the muscles that ought to be contracting, while the patient himself assists with gradually increasing power to turn the fly-wheel. As neither instrument nor patient is very portable, the former is perhaps more useful in hospital than in general practice.

The patient reclines upon a couch, his feet strapped to the foot-pieces (which may be put at any angle), and the handle turned. During half a revolution of the wheel the current flows through one pair of wires; during the other half through the second pair.

Some of the various points where the rheophores may, in succession, be applied, will be found in the description of the treatment of infantile paraplegia at pp. 268, 269.

**CASE.**—Woman, aged 32, paraplegia of four years' duration, probably chronic spinal meningitis; both legs cold, all their muscles much shrunken, with imperfect reaction to faradism; no loss of sensation. Painting with iodine, hot baths, phosphorised liniment, hypodermic injections of strychnia (continued for six weeks), and frequent magneto-electrisation, have failed to benefit her. 21st July.—Strong induction current and passive exercise commenced and continued daily for a month, after which she was able to walk up and down a room, resting only with one hand on tables, &c. The electric treatment to be continued without passive exercise.

### *Single and Double Commutators.*

One or other of the commutators about to be described, together with a set of rheophores, have proved very convenient

in the rhythmical treatment of paralysis of the arm, in paraplegia of children and even that of adults, when the limbs react readily to the current, and in various forms of spasm and tremor.

The single commutator is a little boxwood box, an inch wide, by two-fifths deep, containing a spring which may be depressed by a button at the top. When in circuit the current passes from the battery to the commutator, and thence, when the button is depressed, to one limb or group of muscles (*e.g.*, flexors), when the button is relieved, to the other limb or group. This little key may be held and worked either by the operator or patient. When passive movements require both hands, and there is no assistant, it may be tied by a silk band to the limb.

In infantile paraplegia active treatment is required in order to avoid the atrophy and fatty degeneration which rapidly set in, causing permanent crippling with shrinking of the limbs. The plan followed is that of alternately electrifying similar muscles of opposite sides together with passive exercise. The galvanic current is in general preferable, and five or ten cells are enough to begin with. A rheophore is placed over the dorsal spine and connected with the positive pole. Two other rheophores are connected with the commutator, and this in turn with the negative pole; they are tied in succession over the various similar groups of muscles. For example :

1. Over the hamstrings. The legs are alternately flexed on the thighs.
2. Over the quadriceps extensor cruris of each side. The legs are alternately extended.
3. Over the calves of the legs. Each foot is in turn extended.
4. Over the adductors of each side. The two rheophores are then connected by a wire, which communicates with the commutator. The legs after being parted are brought together as the current flows through both sets of adductors.
5. A cup-rheophore over each external popliteal nerve behind the head of the fibula. The feet are alternately flexed.

CASE.—Boy, aged 6, with paraplegia of two years' duration. Long-continued shampooing, salt-water baths and magneto-electricisation (to which the muscles reacted fairly well) have had beneficial influence, and he was able to walk a little, though

with difficulty. After a fortnight's daily treatment with the galvanic battery and exercise, he is able to run about and jump.

Boy, aged 5, with paraplegia of three years' duration, whose muscles are shrunk and scarcely react to either faradism or galvanism, is slowly recovering muscular power under daily treatment with twenty cells.

In paralysis of an arm a rheophore is tied over the brachial spinal cord, *i.e.* from the third cervical to first dorsal vertebra, and connected with a battery terminal. Two other rheophores connected through the commutator with the other terminal are tied, in turn, over different antagonistic muscles.

1. Over the deltoid and over the latissimus dorsi and teres major, or the pectoralis major. The arm is alternately raised to the shoulder and brought down to the side.

2. Over the biceps and over the triceps. The forearm is flexed and extended.

3. Over the flexors of the fingers and over their extensors. The hand is closed and opened.

4. A cup-rheophore over the musculo-spiral nerve a little external to a point midway between the insertion of the deltoid and the external condyle, and one over the median nerve on the inner side of the biceps at the lower third of the humerus. The hand and forearm are extended and supinated, and then flexed and pronated. Or over the ulnar nerve. The hand is flexed and compressed.

Each couple of movements should be continued for about five minutes. The electricity should be that form which gives most action; as the case recovers passive exercise should be discontinued.

The double commutator is little larger than the single. It contains two parallel springs, with which both wires of the battery are connected. Two pairs of wires carry away the current alternately. Thus two rheophores covering the biceps are connected with one pair, and two rheophores covering the triceps with the other. Telephone wire should be used with this instrument, which, of course, may also be used as a single one.

*Electric Desk.*

This is a form of automatic commutator, for use in spasm, tremor, and paresis of the muscles of the right forearm, and more especially in writers' cramp. *a, b* (Diag. 7) is simply the primitive

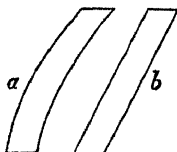


DIAGRAM 7.—“Pot hook,” *nat. size*.—*a*, up-stroke; *b*, down-stroke.

“pot-hook,” formed of two flat pieces of brass. There are ten such pot-hooks in a row; all their “up-strokes” are riveted to a strip of brass which terminates to the right of the desk (Diagram 8), in

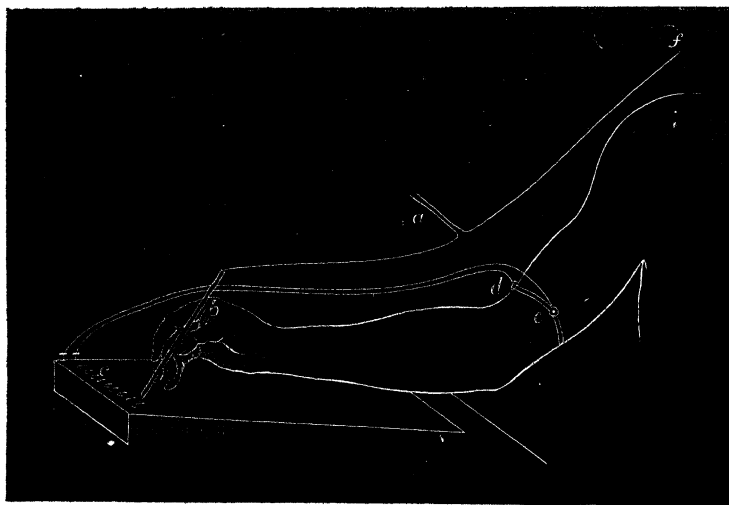


DIAGRAM 8.—Electric desk for use in Writers' Cramp.—*a*, wires to battery; *b* [by hand] pencil; *c*, line of “pot-hooks”; *d* and *e*, cup-rheophores tied over musculo-spiral and median nerves; *f*, wire passing to rheophore tied over region of brachial enlargement of spinal cord, or in axilla.

a binding-screw; and all their “down-strokes,” riveted to another strip terminating in another binding-screw. The pencil is a hollow tube of brass with a smooth blunt point at one end and a

binding-screw at the other; it is covered with india-rubber, so that the hand may not receive the current. One rheophore is connected generally with the positive pole of, say, twenty cells (the induction current seems useless in spasm or tremor), and tied in the axilla, or still better over the brachial spine. Two cup-rheophores are tied over the musculo-spiral and median or ulnar nerves, and telephone wires connected, as in Diagram 8. While the patient draws the point of the pencil over the "up-strokes," he makes the contact by which the musculo-spiral nerve is electrised, and while he draws it over the "down-strokes," contact is made by which the median nerve is electrised. In other words his up-strokes are assisted by electrification of the extensors and supinators, and his down-strokes by electrification of the flexors and pronators.

Of what may perhaps in strictness be called writers' cramp, I have seen very few cases. One, a ticket-writer, who was not greatly troubled except in writing, was satisfied with his own treatment—viz., allowing the penholder to pass between his ring and little finger. Another, a young clerk with trembling of the flexors of the right hand after much writing, received much benefit from daily use of the electric desk for a month, ceasing, meantime, all ordinary writing. Several cases of paresis of the muscles of the forearm, the residuum of paralysis of the right arm, have been successfully treated by this method.

I must defer to another occasion the electrical treatment of the intrinsic muscles of the hand.

NOTE.—The apparatus described in this paper may be obtained from Mr. Hawksley, Oxford Street, W.; or from Mr. Symes, Hardman Street, Liverpool.

NOTE ON SULPHUR PRÆCIPITATUM (MILK OF  
SULPHUR) AS A TOPICAL APPLICATION IN  
DIPHTHERIA.

*(Supplementary to Paper on similar subject in PRACTITIONER for  
April, 1879.)*

BY JOHN A. ERSKINE STUART, L.R.C.S.E.

*Dunst., N.B.*

SINCE writing the former paper on this subject, I have treated several cases in the same manner, and with like excellent results. I now find that to rub the sulphur up with a little water, and apply it on a swab to the throat, is the easiest and safest method of application, for in blowing the dry substance on the throat it was sometimes not so easy to get it on to the desired spot, and besides, the patient, especially if a child, was very apt to cough up sputa in your face, a most dangerous proceeding. In addition to this, I am of opinion that the moistened sulphur sticks better on to the throat than the dry substance, and this is, I think, the advantage which a solid antiseptic has over a fluid, viz., that it exerts its action for a longer time, and this, I think, is also in favour of the method of treatment, where powdered benzoate of soda is blown on to the throat.

In using Sulphur Præcipitatum we get a substance which, being free from grittiness, is more agreeable to the patient. To show the rapidity with which the disease disappeared, when treated in this way, I find that of six cases under this method successfully treated, the average number of visits required from me was 2.5, an extraordinary statement, but one which is perfectly correct.

My former paper has been criticised by both the *Medical Record* and *Braithwaite's Retrospect*. The writers there both seem to think that friction is an important factor in the cure; but no friction has been used by me.

My belief in this method of treatment is strong, from the fact that I have seen some most sudden deaths from the disease, where muriate of iron and chlorate of potash were pushed to a great extent, as also where sulphurous acid was used; and in these no benefit seemed to result from their use, whereas every case I have treated with sulphur has made a rapid recovery as soon as it was tried.

## Reviews.

*Clinical Remarks on Gleet.* By J. C. OGILVIE HILL, M.D.  
London: 1879.

A GOOD clinical lecture in which the author has thoroughly succeeded in his attempt "to bring together, in a short and concise form, the more modern views regarding gleet and its treatment, as given by recent authorities on the subject." The lecture is especially valuable because the subject is of great practical interest to all surgeons practising in large towns, and is hardly more than mentioned in the ordinary text-books on surgery. The author has dealt with it in a most intelligent and useful manner.

*Clinical Lectures on Diseases of the Urinary Organs.* By Sir HENRY THOMPSON. Fifth edition. London: 1879.

THE notable features in this last edition of Sir Henry Thompson's lectures are the much greater frequency with which he employs *anæsthetics* (especially ether) in lithotrity than formerly; and the decided inclination towards the completion of the operation at one sitting, and the removal of the fragments by means of the aspirator. The improved aspirators of Bigelow and Thompson have probably largely contributed to produce this gradual change in the views of the author.

We notice, too, that Sir H. Thompson has added two more cases to the three formerly published of supra-pubic paracentesis for very advanced prostatic or vesical disease. Although the success of the operation, as far as prolonging life is concerned, was not great, the author intends to perform the operation again in fitting cases. A case of this nature has come under our own notice, in which a patient, suffering from severe prostatic disease, left the hospital, wearing a catheter through an opening above the pubes, much benefited by the operation.

*Points connected with Diabetes.* By F. W. PAVY, M.D., F.R.S., &c. 8vo. pp. 126. London: Churchill.

SINCE the discovery by Bernard of the glycogenic function of the liver, our knowledge of the physiology of diabetes has made considerable advance, and much of this we owe to Dr. Pavy. Partly by his own experiments and partly by the views he has advanced, inciting others to renewed research, he has probably done more work in this field than any other labourer except Bernard himself. Yet even now our knowledge of the pathology of diabetes is by no means clear, and we had looked forward with pleasure to much new information from Dr. Pavy's Croonian Lectures before the Royal College of Physicians, of which this present work is composed. In this we confess we are somewhat disappointed, although perhaps unjustly, for we had hoped for information on the disease itself, whereas the author is careful to limit himself to certain points in it. The chief points are a new method of estimating the amount of sugar in the blood by weight; a process for which the author claims much greater accuracy than for the one usually employed. By this method he thinks that he has satisfactorily established that only a small amount of sugar naturally exists in the blood, and that a correspondingly small amount also is present in normal urine. The difference between the sugar in arterial and venous blood is insignificant; so that any destruction of sugar in the tissues must, he thinks, be small. The quantity of sugar in the urine corresponds to, and thus gives an index to the quantity in the blood. As this quantity is normally small, it indicates that very little sugar is normally present in the blood, and instead of the liver being essentially a sugar-forming organ the author considers it to be an organ for assimilating sugar and converting it into glycogen. In its healthy condition it prevents sugar from passing from the portal into the general circulation, but when this function is not exerted the sugar passes into the general circulation, and the urine becomes more or less saccharine. The portal sugar he considers to be formed from nitrogenous as well as from amylaceous and saccharine matter. Its non-assimilation is probably due to alterations in circulation dependent upon nervous changes of a kind allied to loco-motor ataxia and progressive muscular atrophy. The author's views, so far as they go, are probably correct, but it seems to us that they do not cover the whole ground. They explain well no doubt the cases of glycosuria in which the sugar is derived from food, and where the urine becomes strongly saccharine during digestion, and for some time afterwards, but in which sugar is almost entirely absent during fasting; but they do not appear to explain cases where

the urine remains saccharine in nitrogenous diet, and even during fasting.

Another objection to Dr. Pavy's views is that it is easy to understand how the liver contains much glycogen at one time, and but very little at another, for we are accustomed to consider that during digestion the sugar brought to the liver is converted into glycogen, which is stored up in the organ for a while, and then gradually re-transformed into sugar and carried away with the blood to supply the needs of the organism. But on Dr. Pavy's view one does not see what becomes of the glycogen at all. Being insoluble it can hardly be carried away by the blood in the form of glycogen, and if it is not transformed into soluble sugar and thus removed, one would expect the liver to become more and more charged with it, and thus to undergo a steady increase in size, which we know is not the case.

Notwithstanding these limitations, however, Dr. Pavy has dealt very ably with the points he has taken up, and we cannot but regard this work as a valuable contribution to the literature of diabetes.

*First Lines of Therapeutics.* By ALEXANDER HARVEY, M.A., M.D., Emeritus Professor of Materia Medica in the University of Aberdeen. 8vo. pp. 278. London: H. K. Lewis.

WE are so much accustomed to connect therapeutics with drugs that on reading the title of this work one is inclined to fancy it to be a short epitome of the usual methods of employing them in disease, with perhaps a short account of their physiological action. But in this notion we should be entirely mistaken, for the author, after long experience in teaching materia medica, has come to the conclusion that the first step in teaching therapeutics is to impress upon the student the importance of the *vis medicatrix naturæ*, and the fact that it is not the drugs, but nature which cures disease; and that our remedies cannot take the place of, but simply aid the process of nature. But although the author insists so strongly upon the necessity of the cure by nature and not by drugs, he is not a therapeutic nihilist.

We find in the work scarcely any plans and methods of treatment for special diseases. The only one which strikes us is a case mentioned by the author of a young lad of eighteen, in which general anasarca, accompanied by profound coma, occurred rapidly after scarlatina, and yielded at once to general blood-letting, the coma disappearing in ten minutes, and the anasarca within twenty-four hours after the vascular tension had been thus relieved. With this exception, which is used by the author merely as an illustration, we find no plans of special treat-

ment; and Dr. Harvey devotes all his energies to impressing upon the reader the curative powers of nature, and the physician's duty, not so much to heal the disease by violent remedies, but rather to "obviate the tendency to death" of the patient. The latter part of the work treats of the various modes of dying. Although the author has put forward nothing very new or very strange, yet, perhaps, he has done more good by bringing before students the importance of those natural powers in the patient which the system of continual drugging taught at college and witnessed in practice may be apt to lead them to forget.

## Clinic of the Month.

**Morphia in Asthma.**—M. Henri Huchard has published in *L'Union Médicale*, an interesting series of investigations upon the eupnoëic action of morphia, more especially in regard to the rapid cure of asthmatic attacks by the employment of hypodermic injections of this drug. M. Huchard briefly narrates four cases which he has treated, and then proceeds to quote the favourable opinions of authors who have already made trial of morphia in dyspnoea. M. Huchard believes that opium is of use in certain cases of asthma to combat the spasmodic affection, and he even ventures to regard it as one of the chief remedies. It is readily understood how the bronchial spasm may be reduced by the rapid absorption of morphia, though the drug is less serviceable in bronchial catarrh, and is almost useless in emphysema. Morphia is not only a remedy in sudden attacks of asthma, with great orthopnoea and but little chronic pulmonary mischief, but it is also of use to alleviate in a very short time an old and organic state of the lung. Great benefit is derived from its employment in cardiac pseudasthma, in uræmic dyspnoea and in the last stage of phthisis. In every case the morphia seems to act by alleviating the cerebral anæmia, and the lesions of the medulla. It plays an important part in the therapeutics of heart disease, as has already been demonstrated by M. Huchard, who sums up his previous results in the statement that morphia is to aortic diseases, what digitalis is to mitral affections. The morphia must be administered subcutaneously in dyspnoea, and the injections may be given without any fear of morphinism. M. Huchard believes that morphia causes respiration, and that this eupnoëic action is apart from its narcotic effect. In any case his results are readily verified in every day practice. (*Le Progrès Médical*, July 5, 1879.)

**Purpura Hæmorrhagica treated with Astringents and Faradisation.**—Dr. Shand has lately treated a case of purpura hæmorrhagica occurring in a girl aged eight years with astringents. The usual remedies of dilute aqua-regia, quinine,

aloes, oranges, and cod-liver oil having failed, he altered the treatment to the liquid extract of ergot, one drachm and a half; tannic acid twenty grains; glycerin, half an ounce; syrup of oranges, half an ounce; to two ounces of water; a teaspoonful given every hour whilst the bleeding continued. Camphorated oil was applied over the area of the affected lung, and where the latter was applied there was a corresponding mass of ecchymosis produced, on account of which simple fomentations were afterwards employed. As the patient still grew worse, a one-grain morphia suppository was given, and the interrupted current was applied, running over the whole surface of the body by means of sponges. This was repeated every two hours, till the motions ceased; as griping occurred a piece of soap was injected, which produced two evacuations: the first consisting of blood, the second nearly normal. Next day the patient was much improved and the bleeding had almost entirely ceased. Bisulphate of quinine, eight grains; dilute sulphuric acid  $xv\text{m}$ ; sulphate of iron, grs.  $xij$ ; syrup of oranges,  $\mathfrak{z}\text{ss}$ ; water to  $\mathfrak{z}ij$ ; a teaspoonful as directed, was then prescribed. The patient made a good recovery and since then has enjoyed good health. (*The Lancet*, July 19, 1879.)

### Iodine in the Treatment of Intermittent Fevers.—

Dr. Wadsworth records the results obtained in 260 cases of intermittent fever which he has treated with iodine during a severe epidemic which occurred at the beginning of the present year in Saltillo, Mexico. Many of the cases were chronic, extending over various intervals of weeks and months. In the severe cases ten to fifteen grains of quinine, in two doses, were generally given during the apyrexia, immediately followed by the compound tincture of iodine in doses of  $x$ — $xv\text{m}$  thrice daily. In the most severe cases the following formulæ was used:—

R. Liq. potass. arsenitis . . .	$\mathfrak{z}j$ .
Tinct. iodin. comp. . . . .	$\mathfrak{z}ij$ .
Tinct. serpentariæ } . . . .	$\mathfrak{aa} \mathfrak{z}jss$ .
Syrup. simpl. . . . .	
Aquæ font. ad. . . . .	$\mathfrak{z}ij$ .

M. Sig. A tablespoonful thrice daily after meals.

In every case the paroxysm was arrested within twenty-four hours, and the twelve doses lasting four days were sufficient to guarantee the case, with the exception of eight relapses, six being on the fourteenth day, one on the twenty-first, and but one on the seventh. In no single instance, although the cases occurred under the most miserable hygienic surroundings, did there occur a failure to effect an immediate cure, when the

medicine was taken as directed. (*The New York Medical Journal*, vol. xxix. No. 5.)

**Ergot in the Treatment of Pneumonia.**—Dr. Wells states that the value of ergot in pneumonia has long been appreciated, and from its therapeutic action he has been for a long time persuaded of its equal efficacy in pneumonia. He has employed it in ten cases, in all of which the “rusty” sputa were speedily and permanently arrested, and the attack in half the cases aborted; in the others, so shortened as to recover in six or seven days. This remedy acts promptly in pneumonia as in hæmoptysis, whether used hypodermically or per ora, and in a few hours arrests the “rust” by relieving the intense congestion on which it depends. Dr. Wells usually combines the remedy in the following way:—

R. Ext. fl. ergotæ . . . . .	f. ℥iv.
Tr. digital. . . . .	f. ℥j.
Plumb. acetat. . . . .	gr. vj.
Aquæ cinnamomi ad . . .	f. ℥ij. M.

Sig. Give a tablespoonful every two hours until the bloody sputa stop—then twice a day. The treatment is commenced by an antipyretic dose of quinine—from forty to sixty grains—which, in connection with the ergot mixture, equalises the pulmonary circulation, relieves the congestion and inflammation, and the patients recover in about half the time required by other modes of treatment. (*The New York Medical Record*, vol. xv., No. 17.)

**The Treatment of Laryngeal Phthisis.**—Dr. Bosworth first cleanses the parts preparatory to the use of more special applications by a solution containing crystallised carbolic acid, ℥xij. Bicarbonate of soda, biborate of soda, āā gr. xxiv., glycerin, ℥jss, and rose-water to ℥viiij. After thoroughly cleansing the parts by means of this solution, anodynes are applied if it is thought necessary, such as 5—10 grs. of morphin with the addition of sod. carb. or potass. carb. to give an alkaline reaction. A small portion of acacia mucilage may be added to increase the soothing effect. The next step in the treatment consists in the application of an astringent. In the order of preference there may be used zinc. sulph. gr. x—℥j; silver nitrate, gr. iij—v to ℥j; zinc chloride, gr. iij—℥j; tannin and glycerin, ℥j—℥j; and the persulphate of iron, ℥xx—℥j, the selection of the special astringent being governed somewhat by the effect and tolerance. Finally iodoform should be applied to the surface of the ulcer. This is used for its specific action; it

is easily borne, rarely gives pain, and its effect in many cases is most satisfactory. The formula generally employed is as follows: *R.* morphine, gr. x; tannin, ʒij; iodoform, ʒvj. *M.* Sometimes the saturated solution in ether is used ℥℥—ʒj, but the powder is generally preferable. (*The New York Medical Record*, May 17, 1879.)

### **The Stigmas of Maize in Disease of the Bladder.—**

Dr. Dufau believes that the introduction of the stigmas of maize into therapeutics is still too recent to afford sufficient material for the study of their mode of action. He puts forward, however, certain conclusions at which he has arrived, founded upon cases which have occurred in his own practice, as well as from the contributions of numerous friends. The stigmas of maize have a much greater influence in all diseases of the bladder, whether in cystitis, gravel, or any other case, when they are fresh than when they have been kept. In acute traumatic cystitis as well as in blennorrhagia, they exert a marked diuretic action, with an increase of the pain. In such cases, therefore, it is better not to make use of this drug. The best results from its use are obtained in the case of patients with gravel, either uric or phosphatic, or in those who are suffering from chronic cystitis, whether the disease is simple or is a result of gravel, and in mucous and muco-purulent catarrh of the bladder. Under the influence of the maize all the symptoms, such as vesical pain, difficulty in passing water, the excretion of dark-coloured urine, the ammoniacal odour, &c., rapidly disappear. The retention of urine frequently gives way to this mode of treatment, but the catheter should still occasionally be used, as the bottom of the bladder is not always completely emptied. Many of the patients under observation had previously employed the more usual remedies of tar, turpentine, and Vichy or other mineral waters, with varying results. The stigmas of maize often afforded relief where such means had failed. In some cases a certain improvement was effected by the methods alluded to, after which the condition of the patients remained stationary. The administration of the stigmas of maize produced in these cases either a cure, or a turn for the better, and induced a favourable action of the previous remedies. In other cases, however, these preparations which had been of no avail when first given, became efficacious after the ground, so to speak, had been cleared by the stigmas of maize. More generally, however, the maize alone was capable of effecting a cure. In some cases it is well to combine the maize treatment with the usual external applications; of these the irrigation of the bladder with a stream of water is very useful, but the best method is to inject various solutions, such as borax, tar, silicate

of soda, or bicarbonate of soda if the urine is very acid, and benzoic acid if it is strongly alkaline, &c. The stigmas of maize act as very energetic but perfectly harmless diuretics in diseases of the heart, in albuminuria, and generally in all those cases in which an ordinary diuretic is required. In a number of cases the quantity of urine is increased three and even fivefold within the first twenty-four hours, and in other cases this drug has been employed for two to three months without accident. It is useful to remember this fact, as the diuretics in ordinary use, nitrate of potash, digitalis, squills, &c., are not always convenient, or free from danger. The mode of preparing the stigmas of maize has been already described, but it is not perhaps sufficiently well known. The stigmas as a decoction give the same results as the extract, but they are much less active and have an irregular action which is easy to explain. The plants are picked and dried under varying conditions, and they are sometimes even ground, hence the decoction varies in strength from day to day. The extract and syrup, however, having always the same composition, give constant results, and as the volume is less, a much larger dose of the drug can be administered. From an economical point of view it is best to give the syrup in the decoction of stigmas. It is in fact of great importance, as with all diuretics, to dilute the syrup with a certain quantity of water; the results obtained with the extract given in the form of a pill differ sensibly. The syrup, with a decoction or with water, forms a very pleasant drink, of which patients do not get tired. The drug should be taken fasting. Two or three teaspoonfuls of the syrup a day are generally sufficient. (*Le Progrès Médical*, July 19, 1879.)

**Physiological Action of Copper.**—For some years past the majority of medical men have no longer considered the salts of copper as true poisons, their innocuousness being partly due to the fact that when they are taken in any considerable quantity they cannot be kept in the stomach, but produce vomiting. It remained to be ascertained whether in animals incapable of vomiting, salts of copper act as poison. At a recent meeting of the Société de Biologie, M. Gallipe described some experiments on the subject. He had given several rabbits copper with their food. One of these animals received daily, for six months, two grams of acetate of copper. At the end of this period the rabbit showed considerable fattening. Its liver weighed seventy grams and contained thirteen centigrams of copper. Further, the rabbit was eaten by the experimenters, who were no way incommoded thereby. This is one fact more (says *La Nature*) in favour of the so-called rehabilitation of copper. (*Nature*, July 24, 1879.)

**Localisation of Arsenic in the Brain.**—Experiments have recently been made on guinea-pigs by M. de Poncy and Livon (*Comptes Rendus*) with reference to the localisation of arsenic in the brain, when arsenious acid was given in small doses daily with the food. They found that phosphoric acid increased considerably in the urine, and it can only have come, the authors point out, from elimination by substitution, not from a pathological state of the animal, for in cerebral affections rather a diminution than an increase of phosphoric acid in the urine has been observed. The arsenic then seems to replace the phosphorus of phospho-glyceric acid in lecithin, producing arsenio-glyceric acid. The authors are attempting to isolate this new base. (*Ibid.*)

**Treatment of Cape Diarrhoea and Dysentery.**—Dr. Brinsley Nicholson prescribes the following in the form of diarrhoea which so often passes into dysentery :—Acetat. plumbi. gr. iv. ; pulv. opii. gr.  $\frac{1}{2}$ . Each dose to be given as a rule every four hours, night and day. In the Cape dysentery one large dose of mercury was given, followed at once by ipecacuanha. The dyspeptic symptoms which appear in the spring and autumn may be advantageously treated with Gregory's powder, or a modification of it, with a bitter added (thus the formula becomes tinct. rhei. c. ℞xx. sodæ bicarb. gr. x—xx. tinct. gent. vel. quassiae vel. cinchon. ʒj. vel. liq. strychninae, ℞ij.), tinct. zingib. &c., q. s. One form of the dyspepsia is noteworthy. The patient eats well and does not complain of pain, &c. ; but immediately after or just before finishing his breakfast, he feels a sudden desire to get rid of it, and throws up what he has taken, generally with no pain and but little effort. The evacuation sometimes appears to occur downwards instead of upwards, and in such cases of dyspeptic diarrhoea, not acetate of lead, but lime-water, saccharated lime, or chalk, with some of the ingredients mentioned above, and with or without other astringents, and a little opium, is most useful. In the treatment of dysenteric cases the occasional and cautious use of laxatives, not purgatives, has been found useful. They are called for where astringents having acted well, are followed by an after exacerbation, a result which may possibly be ascribed to an astringent effect on the bowels in excess of the good effects on the mucous membrane and its secretions, which are then pent up. The mildest and best laxative in such cases is perhaps a small dose of castor-oil guarded with opium or hyoscyamus, care being taken that its action be checked after, at least, the second free evacuation. In applying blisters it is often a useful plan to apply one along the ascending or descending colon, and when it is about to heal a second along the other. (*The Medical Times and Gazette*, July 5, 1879).

**A Rare Cause of Œdema.** Under this heading Dr. Hess reports the following case. A retired merchant, fifty-six years old, who is suffering from a very slight paralysis of the legs and occasional failing of memory, for which he had been attended from time to time, sent for Dr. Hess on account of symptoms of dropsy. When first seen his legs were found to be nearly double their natural size, the skin of the abdomen being œdematous up to the umbilicus, and the abdomen itself occupied by a large tumour, extending in the median line from the symphysis to the pit of the stomach. The whole of the pelvis was filled by a tense tumour, which fluctuated on pressure from above. The patient did not complain of any scarcity of urine. A catheter was sent for, and nine pints of clear acid urine were withdrawn. For a few days the bladder filled again to some extent; but the œdema began to diminish, and was gone at the end of a week. The daily introduction of the catheter and faradisation; iron and nuxvomica internally; injections of permanganate of potash while the urine was offensive and alkaline, as it turned immediately after the first catheterisation, have restored the bladder to its normal condition. (*The British Med. Journ.* July 26, 1879.)

**Quebracho, a Palliative Remedy in Dyspnoea.**—Dr. Penzoldt of Erlangen (*Berl. Klin. Wochenschr.* No. 19, 1879) narrates some experiments both on man and animals with a new drug, the bark of *Aspidosperma quebracho* (Apocynaceæ) sent from Brazil where it is reputed to have antipyretic properties. The form of preparation used was a watery solution of an alcoholic extract of the bark. The main results obtained in frogs were complete motor paralysis of central origin, respiratory paralysis and diminished frequency of the pulse, independent of irritation of the vagus. In rabbits and dogs, motor paralysis and dyspnoea, increasing with the dose administered, were noticed. The dyspnoea in the rabbit, however, appeared to depend on retardation and deepening of the inspirations; while in the dog the inspirations were accelerated. In the latter also there was salivation. Experiments on animals with artificial fever produced by injecting putrid fluids, showed no decided reduction of the temperature. It is not an antiseptic, but only temporarily retards putrefaction. The results obtained in actual cases of fever in men were also negative. By the accidental observation of a patient with pleurisy and emphysema, on whom the antifebrile effect of quebracho was being tried, Dr. Penzoldt was led to try the bark in various forms of dyspnoea, depending on emphysema, bronchitis, phthisis, pleurisy, &c., and obtained remarkably good results. A teaspoonful of the solution was given two or three times a day. The most marked objective phenomenon after its exhibition was a reddening of the previously cyanosed or livid tint of the lips

and face. The respirations generally became deeper and less frequent, and the patients expressed themselves subjectively much relieved. The first feeling after taking the drug was one of warmth in the head; many said that they had less desire to cough, and that they found expectoration easier. Occasionally sweating occurred, and in some cases abundant salivation. No bad effects were noticed with the dose mentioned. Dr. Penzoldt finds that the addition of quebracho solution to blood, in the presence of oxygen, makes it assume a bright red colour, and he is inclined to think that possibly the blood is rendered capable of taking up more oxygen than usual, and carrying it to the tissues. As yet, quebracho bark is not a commercial product, but the wood is imported in large quantities for tanning purposes. The action of an extract of the wood is similar to that of the bark, but weaker. The alkaloid aspidodermin affects the frog on the whole just as the extract of the bark does. (*The Medical Times and Gazette*, July 12, 1879.)

**The Action of Ferments employed as Digestive Agents.**—M. Vulpian, on the reading of a paper of M. Mourrut, upon artificial digestion, contributed the following note in regard to the action of the digestive ferments employed in the treatment of dyspepsia. In the lecture at the School of Medicine, delivered last session, M. Vulpian had occasion to discuss the normal and pathological secretions, and was led when considering the secretions which promote digestion to speak of dyspeptics, and of the various means which are employed to relieve them. Foremost amongst the remedies of this kind are the digestive ferments pepsin and pancreatin, to which may be added the vegetable diastase, for various observers have attributed to this ferment the power of assisting the saliva and pancreatic juice in digesting starchy materials, M. Vulpian has made a number of experiments in regard to the action of these substances. He has asked whether the ferment action is exerted freely under the conditions in which the ferments are placed in the stomach; and whether they manifest the same activity under whatever pharmaceutical form they are ingested. By means of artificial digestions he has readily proved that the pepsins sold by different chemists have not all the same digestive power. In some cases the cooked albumin undergoes a slow but slight change. The addition of alcohol to an acidified solution of pepsin or to normal gastric juice, however, hinders the digestion. Relying upon these negative results, M. Vulpian is of opinion that it is useless to prescribe wines and elixirs of pepsin. Diastase and pancreatin also when mixed with natural or artificial pancreatic juice are far from exercising upon starchy materials such active properties as when they are brought into contact with them by means of simple

water. (*Acad. de Méd. Séance du 12 Août, repeated in Progrès Medical, August 16, 1879*).

**Chloride of Sodium with Corrosive Sublimate Injections in Syphilis.**—In the *Mémorialien*, July 9th, 1879, Dr. G. Matthès speaks of the disadvantage of the hypodermic injections of a simple solution of corrosive sublimate in syphilis, on account of the abscesses and painful swellings which follow. For two years in Vienna he has assisted at the clinic of Dr. Henry Auspitz, and gives their experience in the use of corrosive sublimate in solution with common salt. Dr. Auspitz mixes the salt with the corrosive sublimate, and selects the buttocks as the best place for injection. Then he inserts the needle and penetrates the gluteus maximus, using a Pravaz's syringe of a solution every second day, according to the following formula :

℞ Hydrarg. bichlor. gram i.  
Sodii chlor. gram. ij.  
Aq. dist. grains 100.

This solution is almost entirely painless, and Dr. Matthès has never, either in Vienna or in thirty-five cases in private practice, seen any harm resulting from its use. In the thirty-five cases he used about 850 injections, and never saw an abscess result. The swelling after injection was much less and disappeared much more rapidly than that after the use of the corrosive sublimate alone. The injection was only used on alternate days, to prevent any chance of salivation. Generally twenty to thirty injections were sufficient to effect a cure. (*The American Practitioner*, August, 1879.)

**Salicylate of Iron.**—Dr. Walls White prepares the salicylate of iron by dissolving together sulphate of iron twenty-four grains, salicylate of soda thirty grains, and acetate of soda twenty grains, in an ounce of water. The solution has at first a pale port-wine appearance, which darkens on exposure to the air: it has a pleasant taste, and each ounce contains thirty grains of salicylate of iron. Its primary action seems to be to promote secretion, stimulating the skin. It does not constipate the bowels, but rather corrects the alvine secretions. As a prophylactic against septicæmia after surgical operations it is valuable. For diphtheria and the aphthous condition of the tongue in children, in solutions containing 4-10 grains to the ounce, combined with glycerin, or with chlorate of potash, or both, it can be used with freedom as a mouth wash, and as a medicine. In erysipelas it may be given in doses of a tablespoonful, alone or combined with diaphoretics. It promotes perspiration, cleans the tongue, lowers

with freedom and in large quantities in cases of anæmia, without interfering with digestion. In skin diseases also, and in desquamative nephritis where the digestive organs have become weakened, and a salt of iron is indicated, its powers are very marked. Salicylate of iron seems to combine the astringent powers of the iron, but in a minor degree to the sulphate or perchloride, with the antiseptic, antipyretic powers of the salicylic acid. If the preparation is long continued some of it passes out unchanged with the urine. (*The Glasgow Med. Journ.*, August, 1879.)

**The Treatment of Excitement.**—Dr. Campbell contributes some interesting notes upon the treatment of excitement, by sedatives or otherwise. He finds that in the treatment of excitement, if sleep at night could be produced the patient did better than when kept under the influence of sedatives during the day. That though chloral is a most efficacious sleep-producer when given at night, yet as a sedative employed in frequent or repeated doses it was dangerous from its depressant effect upon the heart. That in the excitement of general paralysis it was not good treatment to give sedatives that tended in their action to diminish the already impaired powers of locomotion and deglutition. In twenty-eight cases in which continuous sedative treatment was adopted, the sedative chiefly relied upon was bromide of potassium in combination with tincture of cannabis indica, or with tincture of hyoscyamus, compound tincture of valerian, and occasionally tincture of opium. When a sleep-producer was alone required, chloral, in doses of from twenty to thirty grains in a glass of sherry, was found to be amply sufficient. Dr. Campbell further holds that the necessity for giving sleep-producers may be much diminished by open air exercise and employment, in the case of chronic patients who are excited and sleepless. That careful, frequently repeated feeding is as necessary in the treatment of acute excitement as in that of any other acute and exhausting disease, since its neglect may induce dementia. In the vast majority of cases of acute excitement, moreover, exercise in the open air does away with the necessity for sedative treatment or the use of sleep-producers, whilst it obviates in a great measure recourse to seclusion, but involves extra supervision and more attendants. After a use of bromide of potassium for a space of six years, Dr. Campbell can corroborate the evidence of others as regards its efficacy in the treatment of epilepsy by reducing the number of fits and allaying the irritability which is almost always concomitant with epilepsy. He also finds that the morning shower-bath lasting about half a minute during the summer months, is an important auxiliary in the treatment of excitement in the young of both sexes, whilst in

some cases, where excitement appears to be due to ovarian irritation, blistering over the ovaries appears to do good. (*The Lancet*, August 2 and 9, 1879.)

**Psoriasis Treated by Subcutaneous Injections of Arsenic Acid.**—A. Tichomirow treated a case of diffuse psoriasis vulgaris in a boy ten years of age, by subcutaneous injection of arsenic acid. The case presented the usual symptoms of this disease in its chronic state. Although widely disseminated over the entire body the eruption was most marked upon the extreme surfaces of the knees and elbows. It had already lasted over a year, and all syphilitic taint could be readily excluded. At the beginning the treatment simply consisted of daily subcutaneous injections of  $\frac{1}{8}$  grain of arsenic acid in solution. This amount was gradually increased every three or four days until  $\frac{1}{4}$  grain was administered daily. As early as the sixth day of this treatment the scales began to disappear from the back and chest and did not reappear. When about one grain had been given the infiltration of the face and neck had so far passed off that after inunctions of oil and washing with warm water the surface was perfectly freed. The thighs and nates were the last portions of the body to be freed from the eruption, in consequence probably of the frequent irritation by urine, the boy having been troubled for some years with nocturnal incontinence. The treatment lasted altogether five months, during which time four and a half grains of arsenic acid were injected. The writer claims that this is the third case in the literature of the treatment of psoriasis by this method. The first two were reported by Dr. Lipp, in one of which forty-eight and in the other thirty-eight days sufficed to effect a cure without the employment of any external remedies whatever. In the former 8·8 grains, in the latter 4·5 grains were administered. (*Moskowskaja Medizinskaja Gazeta*, No. 39. *The Dublin Journ. Med. Sci.*, August, 1879.)

## Extracts from British and Foreign Journals.

**On the Spectroscopic Examination of the Urine.**—Drs. Forrest and Finlayson have examined the urine by means of the spectroscope in two cases of paroxysmal hæmatinuria. The urine from both patients showed, in addition to the two well-known bands of oxy-hæmoglobin, a third somewhat narrow absorption-band about the middle of the red in the spectrum. This latter band is due to a substance known as scarlet cruorin, or oxy-hæmato-crystallin. On keeping the specimens it was found that the absorption-band in the red disappeared spontaneously, and on adding ammonia to those specimens in which the band in the red was still visible, it was found that the third band disappeared. Drs. Forrest and Finlayson therefore conclude that the spontaneous disappearance of this band in the red is connected with the ordinary ammoniacal changes which occur in urine. From experiments made by the authors it appears probable that the third band is due to the presence of hæmatin in the urine, derived from the decomposition of the hæmoglobin; upon this point, however, they cannot as yet be certain. At any rate there seems to be indications of the presence of two separate ingredients as determined by spectrum analysis, and it appears desirable that as opportunity occurs further observations should be made to ascertain how far this peculiarity is constant in paroxysmal hæmatinuria. (*The Glasgow Medical Journal*, June, 1879.)

**Il Tayuya as an Anti-syphilitic.**—Dr. C. Pellizzari publishes the observations which he made upon nine cases occurring whilst he acted as assistant in the clinic for syphilis of Professor P. Pellizzari in Florence. Four of these are peculiarly instructive, as they show incontestably that tayuya is useless in this disease. The patients who dreaded mercury were treated with tayuya for several months, when relapse after relapse was observed. The pains were not removed, nor was the time of recovery from any single eruption shorter than the normal. Finally each of the four cases suffered severely from affections of the kidneys, iris, &c., which are to be looked upon as

consequents of the treatment adopted. In each case potassium iodide gave immediate results. Dr. Pellizzari concludes with a reference to the unscientific recommendations of universal panaceas, more especially to the so-called "blood-purifiers." In the discussion upon these cases by the Medical Society of Florence, Dr. Marcacci, of Professor Michelani's clinic, and Dr. Zanarelli, who has made observations upon prostitutes, were unanimous in denying to tayuya any antisymphilitic properties. (*Le Sperimentale*, 1878, No. 7—*Centralblatt f. Chirurgie*, May 3, 1879.)

**The Physiological Effects of Sodium Carbonate.**—Dr. Schoenlein has investigated the effects of sodium carbonate upon the rhythm and form of the heart-beats. He has experimented with frogs, some of which were placed under the influence of urari, whilst others were not poisoned by this drug, but had the medulla destroyed, whilst to others atropin as well as urari was administered. The solutions of carbonate of soda employed had the strength of five and ten per cent. respectively. The action of the salt is apparently to alter the substance of the ventricle, without stimulating the inhibitory nerves. The observations of the author need to be carefully corroborated, however, before the results can be applied to warm-blooded animals. (*Archiv. f. d. gesam. Physiol.*, vol. xviii., p. 26—*Rev. des Sci. Med.* 1879.)

**Hedysarum Gangeticum in Dysentery.**—Mr. Amrito Lall Deb is desirous of bringing to notice the medicinal virtues of the root of *Hedysarum gangeticum* in the treatment of dysentery. Within the last three years he has tried this medicine in numerous cases, and is fully convinced of its efficacy in dysentery. The plant from which the root is obtained enters into the composition of the Doshomool panchon (decoction of ten herbs) of the Indian pharmacopœia, which has been in use in the treatment of fever from a very remote period by native koberajes. But the use of the root in dysentery does not appear to be mentioned in any of the works on Hindoo medicine. The mode of administering the drug is very simple. The root in its fresh state is ground down to a pulp on a curry stone with a little water, and may be given three or four times a day, or every four hours, as the case demands, in doses varying from thirty to forty grains each time, in adults. It does not produce nausea or any unpleasant sensation in the system. Under its use the motions become feculent, blood and slime disappear, tormina and tenesmus subside, and the patient is gradually restored to health. It is perfectly innocuous, and can safely be given at all ages. In point of medicinal value it stands next to *Ixora coccinea*, and is especially adapted to acute dysentery of

moderate severity. In severe cases the administration of an opium enema is requisite, conjointly with the internal administration of the remedy. The Bengali name of the drug is Salpany. It belongs to the natural order Leguminosæ. It grows wild in many parts of Bengal in the rainy season, but can only be found sparingly at other seasons, when cows graze upon it, and the branches and leaves are lost, by which alone it can be distinguished. It can, however, be readily cultivated. (*The Indian Medical Gazette*, March, 1879.)

**Causes of the First Respiratory Movement.**—Dr. Franz von Preuschen has reinvestigated the causes of the first movement of respiration which takes place in the newly-born child. Béclard, Schwartz, and Schultze held that this movement was due to an excess of carbonic acid in the blood of the child which had been lately separated from the body of its mother. It was in support of this view that they adduced the fact that if the abdomen of a pregnant animal be opened and the foetus be watched whilst the aorta of the mother is compressed, the mouth opens and the foetus makes an effort to breathe. Pflüger denies both the experiment and the theory which led to it, but the results of von Preuschen are confirmatory of the original doctrine. If the foetus opened its mouth it would be unable to make any inspiratory effort, because the thorax remains motionless until the membranes be ruptured, when inspiratory movements at first hurried, but afterwards slower and more regular, are clearly to be observed. In cases where the membranes are not ruptured the animal dies without making any numerous or regular inspirations. From these results Pflüger concludes that the true stimulus to respiration is the air, but von Preuschen declines to accept this hypothesis, for he believes that it is due to a reflex irritation from the skin, which is stimulated by the cold. If a small hole be made in the membrane so that the snout is alone exposed, it is not sufficiently stimulated by the air to commence energetic and rhythmic respiration: whilst if the membranes be broken through all the phenomena described are noticeable. Finally, if the stimulation of the air to the respiratory apparatus was the true cause of the respiration, it should be stopped on cutting the vagi. The author, to demonstrate this, has cut the vagi in foetuses both before and after their removal from the membranes, and he states that in both cases on exposure to the cold of the surrounding air the respiration began rhythmically, though somewhat more slowly than usual. Von Preuschen concludes by stating that these experiments lead him to reject the opinions held exclusively by Béclard, Schwartz, Schultze, and Pflüger. (*Zeitsch. f. Geburts und Gynak*, vol. i. heft 2.—*Revue des Sci. Méd.*)

**Internal Use of Quinia in Cystitis.**—Dr. Simmons finds that quinia is a sedative to the neck of the bladder; he also states that it is of use in the treatment of affections of the bladder itself. To exemplify this he quotes the case of an elderly patient who suffered from cystitis of long standing, and to whom quinia in 10-grain doses three times a day was administered. On the second day, without any other treatment, the urine was less offensive and less cloudy than it had been for some time, whilst all the more distressing symptoms rapidly diminished until, on the twelfth day of the treatment, the urine was passed but two or three times during the night and as often in the day, with comparatively little pain or inconvenience. Dr. Simmons thinks that though this mode of administering quinia may yield no better results than by its injection into the bladder, it has the advantage of being more easily given. In both methods the mode of action of the quinia is, doubtless, the same, viz., by its power of preventing or arresting putrefactive changes in the urine, as, according to Dr. G. Kerner, 70 per cent. of the drug is eliminated by the kidneys in from three to twenty-four hours. (*The American Journal of Med. Sci.*, April, 1879.)

**The Treatment of Chorea with Ether Spray.**—Dr. Mareglia describes, in detail, four cases of chorea varying in severity as well as in cause. All had commenced with an alteration in the voluntary movement, after which disturbance of sleep and involuntary movements had appeared. In two cases these symptoms were accompanied by affections of the speech, whilst in one the movements were restricted to the right side, affecting only the facial muscles. In two cases, likewise, the cause was fright, in one a previous attack of meningitis, and in one rheumatism. The age of the patients varied from 7 to 14 years, and they were treated in every case with the ether spray as recommended by Lubelsky. The spray was directed along the whole length of the spine by means of a Richardson's apparatus for a breadth of 7 c.m. The application was continued for 3—4 minutes, and was made twice, thrice, and even four times a day. With the exception of the second case, which had lasted for three months, the disease had not continued for more than fifty days. The treatment with ether was carried on for 17—30 days, except in this second case, where the disease was of more than two months' standing, in which it was continued for forty-five days. Dr. Mareglia describes the result of this mode of treatment as being immediately successful. The symptoms were lessened on the first application of the ether spray, and there was a marked improvement within the week. In the first successful case there was no reddening

of the skin which had been subjected to the ether spray, such as had been noticed by Jaccoud, but there was a marked paleness with the formation of "goose skin." (*Annali Clinico dello Ospedale incurabili*, anno iii. fasc. v.—*Med. Chir. Rundschau*, Jan. 1879.)

**Jaborandi in the Treatment of Syphilis.**—Mr. Lockwood acting upon the observation that people who sweat well recover from syphilis more easily than those who seldom have their skin in an active condition, has made use of the nitrate of pilocarpin to effect this condition. For the purpose of testing the drug he selected two cases, in one of which a considerable amount of mercury had been employed, whilst in the other the mercurial treatment had not been adopted. In the first case, as no improvement was effected by mercury and iodide of potassium, the calomel was reduced from fifteen to five grains, and one-sixth of a grain of nitrate of pilocarpin was given hypodermically every other day before administering a calomel vapour bath. The drug caused profuse sweating, and the patient's condition underwent marked improvement. After thirty-three days' treatment the patient was discharged at his own desire, the progress being still favourable. In the second case, in which no mercury had been employed, one-sixth of a grain of pilocarpin was also given by hypodermic injection. In six minutes profuse sweating occurred, lasting for three hours and a half. Pilocarpin was repeated for two days, and then every other day for a fortnight, when the remains of the primary sore disappeared, and only fading stains of a bad tubercular psoriasis remained; a slight ulceration of both tonsils was not, however, quite cured. The patient was discharged at his own request and has not since presented himself. (*Med. Times and Gaz.* April 19, 1879.)

**Relation between Heart Disease and Hysteria.**—M. Armaingaud publishes two cases which appear to show that there is a relationship between cardiac lesion and hysteria in man, such as is already known to exist between heart disease and chorea. In one of these cases a man, aged 28, suffered from mitral insufficiency accompanied by contraction of the aorta; he also experienced oppression, palpitations, and various phenomena indicating cerebral anæmia, with hysteric convulsions. For a month these attacks occurred two or three times a week. The treatment adopted by the author consisted in the hypodermic injection of morphia, to relieve the cerebral anæmia. The drug in doses of a centigram was at first given daily, but at a later period it was found that two injections a week were sufficient. By this means the convulsions were entirely removed,

whilst the phenomena of cerebral anæmia so far disappeared as to allow the patient to resume his occupation. (*Journ. de Méd. et de Chirurgie*, Paris, May, 1879.)

**Nitrate of Pilcarpin in Pleuro-pneumonia.**—Dr. Newland has found that pilocarpin yields good results in pleuro-pneumonia. He quotes the following case. A patient, aged 55, exhibited well-marked symptoms of pleuro-pneumonia; he was treated with a saline cathartic, after which nitrate of pilocarpin to the extent of  $\frac{3}{4}$  grain was injected hypodermically. An effect was produced in twenty-five minutes. The saliva began to flow copiously, and ten minutes later more active diaphoresis set in which lasted an hour. After this the patient felt greatly relieved, and was able to lie down, his breathing became easier, he had no pain, and slept for four hours. Warm poultices were applied to the chest, and the hypodermic injection of  $\frac{3}{4}$ th grain was repeated the same evening. This dose of pilocarpin was given twice a day for the three succeeding days, after which it was discontinued, as the condition of the patient was so much improved that poultices and tonics were alone necessary. (*The Saint Louis Med. and Surg. Journ.*, Feb. 1879.)

**Arsenic in Uterine Hæmorrhage.**—Dr. Humphrey calls attention to the too little recognised value of arsenic in the treatment of neuralgia and metorrhagia. He suggests that the patient be relieved from time to time by the use of hæmostatics, and if necessary, the tampon, and that 5-10 drops of liquor potassæ arsenitis be directed to be taken three times daily after meals, beginning about ten days before the coming period, in cases of menorrhagia. In metorrhagia, arsenic is to be used in the same way as to dose and frequency during two weeks out of every three, until it has been given for at least two months. It may sometimes be employed in doses of ten drops, three times daily, during the continuance of the flow, using other remedies, if necessary. In spanæmic cases it is well to combine the Fowler's solution with some good chalybeate, as bitter wine of iron. (*The Virginia Med. Monthly*, May, 1879.)

**Nervous Dyspepsia.**—Dr. Worthington Myers considers that the old routine plan of treatment of nervous dyspepsia by blue pill, purgatives, alteratives, stomachics, &c., has no permanent effects, unless it be in the direction of eventually increasing the evil. The remedies employed must be those which will remove the morbid action going on in the nervous centres, whilst they restore the healthy molecular balance. Such remedies are the oxides of silver and manganese; the valerianate, sulphate, and phosphide of zinc; the phosphate and other preparations of iron; the mineral acids; phosphoric acid; nux vomica; strychn-

nia; and especially arsenic and electricity. The following preparation has been employed with the happiest results in those cases of nervous dyspepsia which were the result of cerebral hyperæmia:—

R. Bromid. Sodii, ℥j,  
Ext. of Ergot, fluid. ℥ij,  
Pepsin (saccharated),  
Pulv. carb. liq., āā ℥iij,  
Aquæ, ℥ij.

M. fit mistura. S. A teaspoonful every three or four hours.

It contracts the cerebral vessels to their ordinary size, thereby relieving gastric derangement, &c. If constipation exists, the combination of ox-gall and ext. aloes, āā grs. xv., and podophyllin, grs. iij., made into five pills, of which one is given every night, or every other night, as the case may require, is useful as a purgative. All medical treatment of this disease is most powerfully assisted by attention to diet and regimen, and by endeavouring to employ the patient's mind in light, cheerful, and interesting occupations. When, after a fair trial of blood and nerve tonics the symptoms still continue, either in a modified or unabated form, the application of electricity will be advisable. The application should be made along the course of the spinal nerves for from five to ten minutes daily, a very mild current only being used. The pneumogastric should also be galvanised. (*The Virginia Med. Monthly*, May, 1879.)

**The Arrest of Vomiting in Pregnancy.**—Dr. Rosenthal publishes a paper on the treatment of vomiting during pregnancy, by Dr. Copeman's method. He distinguishes three forms of the affection. 1. Vomiting in the morning during fasting; this generally sets in early in the period of conception, and may cease when the movements of the foetus are first perceived. 2. Vomiting at various periods of the day, especially after meals. 3. Obstinate vomiting, resisting all medical treatment. In two cases which have occurred in Dr. Rosenthal's practice he has tried the method of dilatation of the os uteri, as proposed by Dr. Copeman. The first case was that of a woman aged 34, who had been much troubled with vomiting during her first pregnancy. In her second pregnancy, which followed a few months after the first, she was again attacked with vomiting after nearly every meal. Although not remarkably prostrated, she was much troubled with the frequent vomiting, and sought Dr. Rosenthal's aid. He found the os uteri capable of admitting the tip of the finger. By means of rotatory movements he introduced his finger as far as the middle of the last phalanx into the cervical canal. After this there was no more vomiting. When

he wrote the woman was expecting to be soon confined, and was altogether in a very satisfactory condition. The second patient was a primipara, aged 30, suffering from obstinate vomiting; she had been pregnant two months. In this case a second introduction of the finger into the cervical canal was necessary; this arrested the vomiting, which did not return. Dr. Rosenthal says that in our present ignorance of the causes of obstinate vomiting during pregnancy, he cannot explain the *modus operandi* of Dr. Copeman's method, but he hopes that it will become more generally known. (*Berliner klin. Wochenschr.*, June 30; *British Med. Journ.*, August 2, 1879.)

**Contribution to the Knowledge of Pernicious Progressive Anæmia.**—C. M. Sørensen of Copenhagen (*Allg. med. Centr. Ztg.*, No 54), from observation of eleven cases of progressive excessive oligocythæmia, concludes that the etiology of this always fatal disease is still unknown, and mode of origin generally spontaneous. The blood was first examined, and found to be pale and transparent. A mixture of blood from such patients with artificial serum was always so pale that from this alone the disease could be diagnosed. The number of blood corpuscles counted according to Malassez's method was only one-fourth to one-twelfth of the normal number. As soon as the number had become reduced to about half-a-million, death ensued; it must therefore be assumed that this quantity is necessary for the preservation of life. The red corpuscles were also abnormal as regards size, form, and colour. The serum had an alkaline reaction, and did not dissolve the red corpuscles of a healthy subject. The disease developed in a latent manner; in no case could its commencement be determined. The symptoms consisted in gastric derangements, anæmic symptoms, pale yellowish but icteric colour of the skin, a certain *embonpoint* in spite of great debility, bellows murmur over the heart and neck vessels, constant hæmorrhages on the retina, irregular febrile attacks without ascertainable cause. Death was sure to ensue after a longer or shorter course. Of the eleven cases, nine were examined *post-mortem*, and the following condition was found: Thinness of the blood, granular degeneration of the glandular tissue of the liver, kidneys, and supra-renal capsules, and of the heart; the internal coat of the aorta had undergone fatty degeneration of the capillary wall. Apart from lesions ascribable to faulty nutrition and mal-assimilation other pathological changes of etiological value were noticed. The above eleven cases were observed in the course of a year and a half in the hospital. Seven of them were men, four women. In the latter no connection with pregnancy or parturition could be found, as was stated, to unhealthy occupations, and privations, as Biermer

believes, or to hereditary pre-disposition. One patient only stated that the exertions during vigils with a sick sister, and grief over her decease were the probable cause. The author conjectures the origin of the disease to be in a faulty formation of the red corpuscles, and opposes the hypothesis that their mere transformation is the cause, for in this disease the nutrition of the tissues is rather increased than diminished. For the purpose of exact diagnosis the author emphasizes the counting of the red corpuscles, and by differential diagnosis between it and other oligocythæmic conditions, detects severe cases of chlorosis. In one case transfusion, but without success, was tried, nor did other methods of treatment avail. The prognosis is therefore most unfavourable. (*New York Medical Journal*, May 1879.)

**Hydrate of Chloral in Dysentery.**—Dr. Curci finds that chloral hydrate is serviceable in the diarrhoea of typhoid. He has therefore employed it during an epidemic of dysentery in seventeen cases, always with the best results. At first it was administered in combination with potassium chlorate, but afterwards the latter drug was omitted, and the chloral was given alone in a mess of barley gruel, either by the mouth to the extent of 1–3 grams per diem for an adult, or as an enema (10 grams in 2,000 grams of gruel being sufficient for ten enemata). When given by the mouth it is found advisable to administer some slight purgative beforehand to prepare the bowels for the reception of the remedy. Hydrate of chloral is not only a soporific remedy for dysentery, as was supposed by Dr. Pince, who first pointed out its value in this disease, but it has also a sedative, astringent, anti-spasmodic, and anti-diarrhœic action, in addition to its local coagulating and antiseptic properties. If it only lessened pain by producing sleep, its action would be but transitory, whereas it is very persistent, being in reality a sedative to the brain and spinal cord as well as to the sympathetic system of nerves, and it is the latter system which is chiefly affected in dysentery. After the use of chloral it is found that the evacuations are lessened, whilst the flatus which is such a painful symptom in the disease, is diminished. In regard to the local action of hydrate of chloral it must be considered that one part is absorbed in the intestine, whilst another is passed on by peristaltic contractions into the cœcum, and colon. After administration in a mucilaginous vehicle in doses of 2–3 grams, the peristaltic movements are at first increased, but then ensue diminished sensibility and movement. These phenomena are due to the stimulation and subsequent paralysis of the sympathetic, and it is in this way that the chloral lessens the pain in the bowels, and the secretion. If the administration be

continued till recovery takes place the chloral exhibits its properties of coagulating albumin, destroying the organised ferment, and hastening cicatrisation. In conclusion, Dr. Curci enumerates the other remedies employed in dysentery, and states his opinion that purgatives administered in the early stages of the disease alone approach in value to chloral hydrate. He condemns antiphlogistic treatment, as well as that of opiates and astringents. He has known no good results obtained from the use of ipecacuanha, the so-called radix antidysenterica, since it only acts as an emetic, and is without effect upon the other processes of the disease. (*Il Racogliatore Medico*, Nos. 15-18, 1878. *Med. chir. Rundschau*, May, 1879.)

**Diagnosis of Certain Forms of Asphyxia.**—Dr. Draper, in an interesting paper, discusses the specific appearances which serve to distinguish special forms of death by asphyxia. He also shows the value of a medical examination in determining the cause of death when the circumstances attending such death are obscure or wholly unknown. Citing in the first place a case of death by drowning, the *post-mortem* appearances are briefly summarised as (1) injection of the brain and its meninges, and of the thoracic and abdominal viscera; (2) the blood dark in colour and of fluid consistency; (3) the lungs expanded to their full extent; (4) froth in the air passages and exuding from the mouth; (5) a uniform reddening of the skin of the face, neck, and scalp; (6) cutis anserina. Dr. Draper then proceeds to interpret these anatomical appearances, and he shows that the cerebral anæmia, the condition of the heart, gorged with blood in its right cavities, empty and tense on its left side, the state of the blood, and the congestion of the abdominal viscera, cannot be regarded as specially significant of death by drowning. The condition of the lungs, however, and the presence of froth in the bronchi and trachea and at the lips and nostrils are valuable diagnostic signs. The froth consists of fine bubbles, generally white, but sometimes showing a pinkish stain, and in immediate contact with the bronchial and tracheal walls with the interposition of mucus. The brick-red discoloration of the skin on the face, neck, and scalp, uniformly developed, indicates the beginning of putrefaction in those parts, and it is here that in the bodies of drowned persons decomposition first sets in. The cutis anserina is the result of the nervous shock experienced at the moment of immersion, and it becomes a sign that the body was living at that moment. In a similar manner the appearances seen on the *post-mortem* examination of a man who died from asphyxia due to suffocation are described as being (1) well-marked cadaveric rigidity, with entire absence of putrefactive change twenty-nine hours after death; (2) abundant

deposit of a peculiar soot on the surface of the body, and in the mouth, pharynx, and air passages; (3) *post-mortem* lividity of a peculiar colour; (4) universal fluidity of the blood; (5) uniform vermilion colour of the blood; (6) hyperæmia of the lungs; (7) hyperæmia of the right side of the heart and of its vessels, with vacuity and contraction of the left ventricle; (8) capillary ecchymoses under the pulmonary pleura; (9) froth in the larynx, trachea, and bronchi, with injection of the mucous membrane; (10) injection of the abdominal viscera, especially of the kidneys; (11) hyperæmia of the brain and of its meninges. Of these signs the most valuable, from a diagnostic point of view, are the fluidity of the blood and the injection of the mucous membrane, together with the formation of capillary sub-pleural ecchymoses. All these appearances point to the fact that there was arrest of the mechanical functions of the lungs, quickly eventuating in a destruction of the chemico-vital processes performed by those organs, and the consequent suspension of the heart's action, and of the functions of the brain. The peculiar abnormality in the appearance of the blood affords a basis for the conclusion that the death was the result of that form of blood-poisoning which is induced by the inhalation of carbon monoxide gas. (*The Boston Med. and Surg. Journal*, April and May, 1879.)

**Vaginismus.**—M. Gallard, in the *Annales de Gynécologie*, states that he constantly recommends the gradual dilatation of the vagina by tents of progressively increasing size. According to the circumstances of the case he impregnates these tents with different applications. He also believes that these topical applications aid materially in curing vaginismus. For this purpose M. Gallard recommends the use of iodoform made up into an ointment (iodoform, 2 grams, cocoa butter, 2 grams, fresh lard, 15 grams). This preparation may be employed when there is redness or excoriation of the mucous membrane. If there is only pain without any visible change in the mucous membrane, extract of belladonna, 2 grams, fresh lard, 15 grams, may be prescribed. In this, as in the previous case, the tents may be as small as possible. After the employment of the iodoform ointment it is well to replace it after a few days, when the redness and excoriations have disappeared, by the belladonna preparation. In both cases care should be taken to increase daily, by an imperceptible but still advancing gradation, the size of the tent. By this means at no very distant period, a tent is habitually employed which is of such a size as to allow the introduction of the male organ. In effecting this result the action of the narcotic substance and the progressive dilatation

have both materially assisted each other. (*Journ. de Méd. et de Chir.*, May, 1879.)

**Nervous Dyspepsia.**—Lenbe believes that nervous dyspepsia is due to the mechanical irritation of the nerves of the stomach at the beginning of digestion, and that it is not a consequence of the absorption of the chemical products of abnormal digestion. A sense of fulness in the epigastrium, regurgitation, nausea, irregular appetite, excitability, disinclination for mental work, and feeling of fatigue, especially in the legs, and sleepiness, may all be regarded as normal results of a slight excess over moderate eating. When the symptoms become unusually marked and permanent, they give rise to a severe chronic affection, whose cause is to be sought for in an abnormal reaction of the nerves of the stomach during digestion, and secondarily of the whole nervous system. This nervous dyspepsia is entirely distinct from the nervous symptoms which occur in chronic gastric catarrh, cancer of the stomach, and other affections. The essential difference between nervous dyspepsia and chronic catarrh of the stomach lies in the fact that in the latter affection there occurs loss of appetite, abnormal decomposition of the gastric contents, a prolonged stay of the ingesta in the stomach, with frequent vomiting of the same, associated with abundant mucus. In nervous dyspepsia, on the contrary, the time of digestion is normal, the food passes through the stomach, and there is no mucus present in anything which may be removed from the stomach through the cesophagus. The differential diagnosis between nervous dyspepsia and ulcer of the stomach is more difficult, and the effects of treatment are deemed of special importance in such cases. (*The Boston Med. and Surg. Journ.*, May 22, 1879.)

**Hydriodic Acid.**—Dr. Gill Wylie has obtained good results from the use of hydriodic acid in bronchitis, and in acute or sub-acute catarrhal diseases, though it appears to do harm in acute febrile attacks. He has also used it in chronic malarial poisoning, and in Graves's disease. To obtain the best effects Dr. Wylie prescribes one teaspoonful of a mixture of 1 drachm of iodide of potassium with 90 grains of tartaric acid dissolved in 4 ounces of water. The simple solution, however, rapidly decomposes, and to obviate this it is necessary to mix it with a very heavy syrup. When properly prepared hydriodic acid forms a clear solution, which may be kept several days without showing much sign of decomposition. (*The New York Medical Record*, May 10, 1879.)

**The Physiological Action of Carbonate of Soda.**—Dr. Schoenlein has investigated, under Prof. Bernstein's guidance,

the influence which is exerted by carbonate of soda upon the rhythm and form of the heart-beats. The experiments were made upon frogs, either with or without urari, in which the spinal cord had been destroyed; in some cases atropin as well as urari were administered. Five per cent. and ten per cent. solutions of carbonate of soda were employed. The action of the drug was to produce an alteration in the substance of the ventricle, without any stimulation of the inhibitory nerves, although attempts have been made to explain the action of sodium carbonate upon the hypothesis that it stimulates these nerves. The author's observations need careful repetition on warm blood animals. (*Arch. f. ges. Physiol.* Bd. xviii. p. 26.)

## Notes and Queries.

VISITING-LIST TEMPERATURE CHARTS.—Messrs. Harvey and Reynolds, whose Phoenix Lens Thermometer we lately had occasion to notice, have published very convenient temperature charts, marked in Fahrenheit and Centigrade scales, with columns for the pulse, and spaces for the name, age, disease, and result. They are of a convenient size, and just fit the ordinary visiting list of the practitioner. They may be had either separately or in books.

## Department of Public Health.

### ON THE RECENT OUTBREAK OF PLAGUE IN THE PROVINCE OF ASTRAKHAN.<sup>1</sup>

BY I.R. AUG. HIRSCH.

*(An Address delivered before the Berlin Medical Society,  
18th June and 2nd July, 1879.)*

ABOUT two years ago I raised before this Society the question of the danger to which Europe might be exposed of an invasion of plague by the reappearance of the disease, since 1867, in Mesopotamia and Persia. The fears that I then expressed have been more quickly fulfilled than I anticipated. Towards the end of last year (1878) there appeared in several localities of the province of Astrakhan a malady of the nature of which the medical men on the spot were for some time doubtful; but which afterwards was recognised as Oriental Plague. At the end of December the news of the appearance of this deadly sickness caused a panic in Europe, and several European governments requested permission of the Russian Government to send scientific commissions of inquiry to the affected localities, a request to which willing assent was given. Dr. Küssner, "privat-docent" of Halle, Staff-physician Dr. Sommerbrodt, and I, were appointed for this purpose by the German Government. At this time the disease, it was known, had for the most part ceased in the district where it had shown itself; but the lateness of our appointment was unavoidable. The outbreak was at its

<sup>1</sup> Translated and abridged from the report in the *Berliner Klin. Wochenschr.* 1879, No. 30.

height when the Russian Government first received distinct information as to its nature, and the time necessarily consumed in communications with that Government, and in preparing for the journey, occupied so long a period that it was towards the end of February (Old Style) before we could start on our mission to Vetlianka, the principal seat of the disease.

Our ignorance of the Russian tongue was a cause of anxiety; and we were doubtful whether we should be welcome guests, and whether the Russian Government would give us the necessary means for carrying out our mission. But our doubts were quite uncalled-for. A competent interpreter was placed at our service, and every help was offered us in prosecuting our work. Of the sick we saw little, and with respect to the origin and mode of dissemination of the malady we arrived at no certain results. Nevertheless, much interesting information was obtained as to the general cause of the outbreak, the more salient points of which I propose to submit now to the Society.

The tragedy in the Government of Astrakhan was played out in six localities—three on the right bank and three on the left bank of the river Volga. The province of Astrakhan is a great steppe, cut through by the Volga. The right bank is steep, and rises to a height of from ten to fifty metres above the level of the stream. The left bank is flat, and at one point only two hills are observed deserving of notice. The soil of the steppe consists of a heavy loam, here and there rich in salt, and containing sandstone. The salt lies in some places upon the surface, in other places it is found distributed below the surface in broad strata. The subsoil consists of alluvial clay similar to that which forms the beds of the Volga and the Caspian Sea. The climate is continental, the summers being very hot, the winters very cold. The steppe is treeless, and consequently of the driest. The geological and climatic conditions here referred to govern the culture of the soil. Corn, I believe, is only found in the north-eastern section; but in spring the steppe is covered with a luxurious flora, particularly plants well fitted for fattening cattle. The principal industries of the province are fishing and the gathering of salt. To these industries is owing the general prosperity of the inhabitants, and even the wealth of the localities occupied by the Cossacks. The populations of the several

districts are much mixed, consisting of Russians, Cossacks, Kirghis, Calmucks, and in the south, Tartars. The Calmucks form the true natives or proletariat of the steppe. It will be inferred, therefore, that the conditions of life in the steppe are not unfavourable; and this is manifest in the evidences of comfort observed in the houses and general arrangements of the several communities. This well-being struck me with surprise in view of the unfavourable accounts as to the conditions of life on the Lower Volga, which had at first gained currency here. But it is not to be forgotten that previous to our reaching the province the Russian Government had caused the localities visited to be thoroughly cleansed. Wherever we wended on the steppe we found the streets of the villages wide and well ventilated, and the houses judiciously placed with regard to each other. Each house possessed a verandah, and had its independent court and farm premises. Wood is chiefly used in the construction of the houses; the living-rooms are arranged with a certain degree of luxury, and the furnishing is not bad. Everything about them gives indications of prosperity, and of a certain liking for the comforts of existence. It is noteworthy that many courts contained summer-houses of trellis-work, which are occupied by the families in the hot season. I mention these facts for the purpose of correcting the widely-spread opinion that the plague had some relations, in its origin, with certain asserted bad hygienic conditions under which the communities who suffered from the disease lived; although I do not forget that the measures of cleanliness taken before our arrival altered materially the state of things in the several localities visited. Moreover the preparation of the fish—the disembowelling and salting—gave rise to gross sanitary evils; but these had existed for many years, for example, at Vetlianka, without giving rise to plague; and that place was not placed in more unfavourable circumstances with regard to them than numerous neighbouring places which entirely escaped from the disease.

Throughout the districts on the Volga malaria is prevalent, inflammatory diseases of the respiratory organs, rheumatism, and syphilis are common, and scrofula is not rare. Of the epidemic maladies which have been observed during the past

ten years, scarlet fever, enteric fever, and cholera have played the chief part. The last outbreak of plague in the district, preceding that of 1878-79, occurred in 1807-8. The sickness at that time, it is highly probable, was derived from Asia, carried by pilgrims returning from Mecca, and it spread upwards along the course of the Volga as far as the Government of Saratov. The malady at no time manifested much intensity, and the total number of deaths occurring in the whole of the infected places was estimated at a little over 100.

To dwell now on the outbreak of plague in 1878-79.

Vetlianka is a stanitza, that is to say, a Cossack village, of which there are seventeen others in the Government of Astrakhan. These stanitzas are subjected to a particular management, under the presidency of a Cossack general, who resides in Astrakhan, and who is the intermediary between the communities and the Imperial Government. For the sanitary administration there is a principal medical officer, aided by several competent medical men. The general sanitary regulation of the Cossack villages is entrusted almost entirely to less cultivated army-surgeons (*Feldscheerer*), somewhat similar to our earlier second-class surgeons, and who practice physic in the stanitza. These surgeons report upon the sickness of the localities where they are stationed to the central authority, and the latter under particular circumstances send physicians to their assistance. The Russian Government becomes acquainted with the health conditions of the stanitzas alone through the Cossack administration, acting as described. This dual government (Imperial and Cossack) under circumstances such as the late outbreak is very injurious, and to it must be attributed in a great measure the late knowledge and late action of the Imperial government with regard to the prevalence of the disease at Vetlianka and elsewhere on the Volga.

The disease, as already stated, was confined to six places, of which the central one was Vetlianka, where alone it manifested an epidemic character. The other places affected were Prischib and Staritzkoi on the right bank of the Volga, and Udatschkoi, Michailovka, and Selitrenoi on the left bank; Selitrenoi suffering most, thirty-two deaths having occurred in this village and district. In all these places the disease showed itself in the

middle of December, having been carried to them from Vetlianka, at the period of the acme of the outbreak in that village.

The beginning of the epidemic in Vetlianka occurred at the commencement of the month of October (1878), and from the accompanying return of deaths it will be observed that the malady was very slowly developed. In the first six weeks scattered deaths from plague alone occurred. In the second week of December the number increased largely; in the eleventh week the epidemic reached its acme; and in the following three weeks it fell as quickly as it had risen. The last death from plague happened on the 12th January (1879). From the 1st October to the 12th January the deaths recorded in the village from week to week were as follows:—

October	1—7, 1878 . . . . .	1
„	8—14 „ . . . . .	0
„	15—21 „ . . . . .	2
„	22—28 „ . . . . .	3
„	29—4 November . . . . .	0
November	5—11 „ . . . . .	1
„	12—18 „ . . . . .	7
„	19—25 „ . . . . .	8
„	26—2 December . . . . .	7
December	3—9 „ . . . . .	56
„	10—16 „ . . . . .	169
„	17—23 „ . . . . .	54
„	24—30 „ . . . . .	33
„	31—6 January, 1879 . . .	19
January	7—12 „ „ . . .	12
		<hr/>
		372

This return must be regarded as only approximative, for in consequence of the death of the priest, no entries had been made in the church register since the middle of December. Within the period to which it refers 372 persons died in Vetlianka. If the average number of deaths ordinarily occurring in Vetlianka from October to January, over a period of several years, be deducted from the above total, 358 are to be attributed to plague. In other words 20 per cent. of the living (the population at

the time of the outbreak numbering 1,750) were destroyed by the disease. The number of persons who recovered from the disease is estimated at eighty-one. This would make the total number of attacks 439, in other words it is estimated that 25·3 per cent. of the inhabitants suffered from the disease, and of those who so suffered 82·0 per cent. died.

Prischib was next attacked after Vetlianka. In this place the deaths numbered sixteen, and were distributed in five houses. Then followed an outbreak in Staritzkoi, where in one house seven individuals died. Two localities on the left bank of the river were only slightly touched by the disease, Michailovka, where in one house four sickened and three died, and Udatschkoi, where in one house two individuals died. On this bank Selitrenoi suffered most severely. There, in four houses thirty-two individuals died of plague. It is stated that corpses of persons who had died of plague were found upon the steppe, and in an island of the Volga several fatal cases of the disease took place among persons who had fled there from Vetlianka. The total number of deaths from plague reported in the province amounted to about 450.

I propose to speak only briefly on the character and duration of the sickness. We arrived in the infected district too late to observe any serious cases, and we had to be content with information derived from others. But although our knowledge was thus derived at second-hand, it must be remembered that we had to deal with people of intelligence, and that the results obtained by the different and independent commissions of inquiry tallied closely with one another. For ourselves we saw only a very slight case of plague which occurred at the end of the epidemic. The patient was a girl, aged ten years, who sickened about eight weeks after the last fatal case had happened, and was attended throughout her illness by Dr. Sommerbrodt.

After all we have heard and seen we have no doubt that the sickness was the bubonic plague of the Levant (*Levantinische Beulen-pest*), and that a presumed resemblance, from the affection of the respiratory organs, to "Black Death" or to "Indian plague," was an error. I will not here discuss the question whether Levantine plague is a disease analogous to the Black Death and the Indian plague, or whether, as I have maintained,

it is distinguished from them by the nature of the lung affection. I will simply remark that every lung affection has not an inflammatory character, or is hæmorrhagic, and that neither of these complications was observed in the Astrakhan epidemic. In a few cases only a slight bronchial affection appeared in the course of the sickness. I do not forget that at the time of the plague there was an epidemic of pneumonia, but I do not believe that the diseases had anything in common with each other. As in all previous epidemics of plague, three forms of the malady were observed in this outbreak. First, a slight form, in part unaccompanied with fever, a sort of ambulatory plague in which, without previous marked symptoms, a bubo appeared in the arm-pit, groin, or submaxillary region, which either disappeared after a short time or suppurated, and with this the sickness ended. These cases were chiefly observed at the beginning and end of the epidemic, but were more frequent at the latter period than at the former period. We had the opportunity of seeing a single case of this class. Next, a series of graver cases were observed, which were preceded by several days' indisposition, and which were characterised by a more general affection of the glandular system, mostly ending in suppuration. These cases rarely recovered. Lastly, there were cases of *Pestis siderans*, in which either the morbid process did not manifest itself in the glandular regions, or the bubos were so small as to escape the attention of the medical attendant or of the persons about the sick, and which generally proved fatal in two or three days. I limit myself to this brief notice of the character and different forms of the sickness. Dr. Sommerbrodt gave attention mainly to this portion of our inquiry, and to him I must refer for detailed information with regard to it.

Autopsies were not made during the outbreak. At the time of arrival of the commission at Vetlianka a boy of two years of age died, who had suffered from suppuration of one of the submaxillary glands, and from broncho-pneumonia, the latter affection proving fatal to the patient. It is questionable whether the glandular disease had its origin in the infection of plague; for, although there had been several fatal cases of plague in the house, a glandular affection had been noted in the family some time before, and even at the time of the outbreak of the

plague. One of the Austrian commissioners, who had seen the deceased before interment, described a series of pathological changes, particularly a chronic laryngeal disorder, which to me indicates a probability of the glandular affection being a result of hereditary syphilis. At any rate, a careful examination of the corpse had not disclosed any morbid signs which were characteristic of plague.

A particular interest attaches to the period of incubation of the sickness as observed at Vetlianka. In minima it was from two to three days, in maxima it was over eight days. A very short or a very long incubation period was seldom observed. In the majority of cases, and particularly in the best observed cases, the period was from four to five days, and the average may be set down at five days.

One of the most important, and at the same time most difficult, questions which occupied our attention was that of the origin of the plague at Vetlianka. Was it indigenous or was it imported from some other locality? In the latter case—that is to say, the case of importation—the disease must have come either from Persia or from Mesopotamia, in both of which countries the disease had been present the year before its appearance at Vetlianka. There is not the slightest evidence tending to show that the disease had an indigenous origin. It has nevertheless been suggested that the unsanitary condition of Vetlianka was alone sufficient to give origin to the disease. This suggestion is scarcely worthy of discussion. Conceding that the hygienic circumstances of the place left much to be desired, it must be remembered that they were not worse in 1878 than in previous years, and that since 1807 not a trace of plague had been noticed there. Vetlianka did not stand alone in the district in its unwholesomeness. Numerous other spots which escaped the disease were not less, and even some more, unwholesome; and it is not possible to suggest why the latter should have escaped and Vetlianka have been attacked, if the conditions referred to were capable of producing the malady. Indeed, it must be remembered that there are many places in our own country and in other countries of Europe of which the sanitary conditions are not better, nay, are even worse, than those which characterised Vetlianka before the appearance of

plague there, but in which plague has not shown itself indigenously. I cannot discover, therefore, any ground for the acceptance of the view of an autochthonic development of plague at Vetlianka, and I may add that I hold this opinion in common with the other European commissioners, with whom I have had the opportunity of conferring, delegated to visit the spot.<sup>1</sup>

Much more probable is the suggestion that plague was carried to Vetlianka from Persia. About fifteen miles distant from the southern coast of the Caspian Sea is the town of Resht. Here and in the surrounding district a serious outbreak of plague took place towards the end of 1876, and continued until the beginning of 1878. A transmission of the disease from this district to Astrakhan was all the more possible as measures of quarantine directed to the protection of the Russian provinces from an introduction of the disease were not established until April, 1877. Moreover, the Russian sanitary authorities in Tiflis at first regarded the disease prevalent in Resht as a form of typhus accompanied with buboes, denying its pestiferous nature. The genetic relation of the plague in Persia with the plague in Vetlianka has been held to be proved by the fact that in the summer of 1877 numerous cases of sickness occurred in the city of Astrakhan, which had a plague-like character. I had expressed an opinion that the disease at Vetlianka had been probably derived from a Persian source before I left Germany for the infected district on the Volga, and I anticipated finding confirmation of the opinion on arrival there. The following data bearing on the subject I have collected from the registers of the hospitals in Astrakhan. From July to September, 1877, in the city and environs of Astrakhan, from 100 to 150 cases of the sickness to which reference has been made were observed. These cases were characterised by glandular swellings. They were observed in the submaxillary, the axillary, and the crural regions, but chiefly in the submaxillary. The development of the swellings was preceded by a longer or shorter period of feverishness, the period extending at times to a fortnight. The

<sup>1</sup> [We believe that Dr. Hirsch's opinion on this point is not in accord with that of the English commissioners, Surgeon-Major Colvill and Dr. Payne. Dr. Hirsch and his colleagues had left the plague-infected district on the Volga before Mr. Colvill and Dr. Payne arrived there.—ED. PRACT.]

swellings differed much in size, sometimes suppurating, sometimes dispersing without suppuration. With the exception of one case—in which the swelling having dispersed death occurred with pyæmic symptoms—all the cases recovered. Only a few of the cases were compelled to take to bed, by far the greater number being able to walk about. It is difficult to state with precision the entire number who were attacked, because many consulted several medical men and were entered more than once in the list. In no case did the disease spread from the sick to the healthy. This was particularly observed in the hospitals where many of the sick were admitted. Moreover, the troops in garrison were entirely free from the malady.

The question now arises whether the outbreak of sickness here described, and which the French physicians designated “abortive plague” (*Peste frustrée*), was a slight epidemic of mild plague. This view of the matter has been accepted by the greater number of the medical men in Astrakhan, who speak of a “*Pestis nostris* ;” and it cannot be denied that the form of sickness gives some justification for that term. Contrasted with this mild form of disease and its absolute non-transmissibility, is the murderous character of the disease observed in Resht, the presumed source of the outbreak in Astrakhan. We are here involved in the seemingly hopeless contradiction of assuming the transmission of the infection and a disease from Resht to Astrakhan, which gives rise in the latter city to 150 independent cases, none of which have manifested any evidence of infectiousness.

We can simply state that in the year 1877 a mild plague-epidemic actually occurred in Astrakhan ; and the question arises whether the outbreak in Vetlianka had any causal relation with the Astrakhan outbreak. If we assume such relationship we must infer either that the infection remained latent a year in Astrakhan and then was carried to Vetlianka (where the disease did not occur in 1877), or that the disease was present in Astrakhan and its suburbs in the year 1878. Against the first inference no serious objection can seemingly be raised ; with regard to the second inference the data obtained are doubtful. Certainly there was a rumour in Astrakhan that scattered cases of the form of plague observed there in 1877 had occurred at a later date. In

a supposed case which came under my own observation I found a small boil on the neck; in another case which came under the care of a medical man at the time of our reaching Astrakhan, and which gave him great anxiety, one of the Austrian commissioners [found a simple syphilitic bubo. With reference to the propagation of the disease from Astrakhan to Vetlianka, it must be observed that the two places are separated from each other by a distance of 250 versts [about 160 miles] and that none of the intermediate places were in the first instance attacked, notwithstanding many of them, nearer to Astrakhan, maintained a closer communication with, and presented generally more favourable conditions for receiving the disease than Vetlianka. But if we accept the connection between the two outbreaks, it is in the highest degree remarkable that a disease which, in 1877, should have proved so mild in Astrakhan, should in 1878 have showed itself so deadly in Vetlianka, the local conditions certainly not being worse in the one case than in the other. I note in ending these observations on this branch of my subject a statement bearing upon the assumed direct connection between the outbreaks in Astrakhan and Vetlianka. This statement is to the effect that the first case at Vetlianka was that of a woman who had visited Astrakhan, and returned thence suffering from the plague, which she had acquired there. Careful inquiries made respecting this case showed that the woman sickened three days after leaving Vetlianka, and without doubt the sickness was not contracted on the journey, but had been acquired before she left her home. Moreover, none of the persons she had communication with during her journey to and her stay in Astrakhan, as well as on the opposite bank of the river, suffered from the disease. Finally, the statement rests on an error. The case was not the first which occurred in Vetlianka. Other cases had preceded it.

Notwithstanding that these facts and considerations appear adverse to the conclusions, I should be of opinion that the disease was derived from Astrakhan if no other source of introduction to Vetlianka from without was discoverable.

One of the most trustworthy observers of this epidemic was the worthy priest of the stanitza. His religious duties took him to the sick and dying, and he himself fell a victim to the plague. Among the papers of this individual, after his death,

there was found a very interesting history of the outbreak, together with a brief description of the sickness. I have to thank Professor Eichwald, one of the Russian Commissioners, for a knowledge of these papers, which carried intrinsic evidence of their genuineness. After a short but practical description of the disease and of the painful services rendered by the medical men (*Feldscheerer*), the writer declares:—"This grave sickness (then unnamed) has been brought to us by the Cossacks returning from the war." This view is accepted not only by the inhabitants of Vetlianka but of all the surrounding districts. The priest's history further contains a legend attributed to the women in Vetlianka, somewhat similar to one that is related of the plague of 1630, in Milan. This is to the effect that an old man named Charitonow, coming from Nikoloskoi to Vetlianka met a greybeard, who asked him whether he would have gold and silver. On the peasant answering that he would, he was taken into a court, where large treasures were stored with which he filled his pockets. The peasant, then about to take his departure, asked his benefactor what service he should render in return for his gifts. Thereupon the greybeard answered, "Thou askest too late; thou shalt repay these treasures with thine own limbs and the limbs of those belonging to thee." The interpretation of this legend will become clear from what follows.

The statement that the plague was imported into Vetlianka by Cossacks returning from the seat of war, sets forth that the Russian troops at the seat of war came in contact with individuals or effects infected with the disease. From different sources it is averred that cases of plague occurred in the Russian army of the Caucasus; and this averment appeared to receive a certain degree of support from information given by the Turkish Commissioners that towards the end of 1877 Turkish troops were moved from Hillah to Kars, reaching the latter place in February 1878. But these troops, according to Mr. College [? Colville], an excellent observer and trustworthy informant, came from a locality entirely free from plague, did not pass through or near to Bagdad where the plague reigned, underwent fourteen days quarantine at Kerbela and reached Kars in perfect health. At the same time Mr. College [? Colville] stated that no plague had shown itself in the Turkish army, remarking that it would have

been impossible to conceal the fact had the contrary been the case. It is equally certain that epidemic plague had not occurred in the Russian army. Nevertheless several Russian military medical men reported glandular swellings in the course of petechial typhus, which, in fact, so far as my knowledge extends, were buboes developed in the later stages of the disease, and which were chiefly formed in connection with local gangrenes. Moreover the same argument holds good of the Russian army, that has been advanced with respect to the Turkish army, namely, that plague, had it been present, could not have been concealed. But however this may be, could it be accepted that the Cossack troops were the medium of conveying the disease to Vetlianka? The mortality of this section of the Russian army was very small, and a thorough investigation was made of the state of health of the force before it was discharged, and there was not even a suspicion that a single man returned home ailing to Vetlianka.

But the question remains whether the plague had been brought to Vetlianka, not by means of infected individuals, but by means of infected articles. This seems to have been the priest's opinion, whose posthumous writing we have referred to, and it was the opinion of many of the inhabitants of the place. It appears that it was the spoil brought by the Cossack troops from the war which gave rise to the legend (the greed of which is expressed by the act of Charitonow), and which spoil, it is assumed, containing infected articles, gave origin to the outbreak (the ghastly return for the gift of the greybeard). Charitonow was, in fact, the first killed by the outbreak, and several of his family were among the earliest victims. The priest of Prischib informed us that his brother-priest from Vetlianka came to him at the beginning of the month of December, and told him that the plague had been imported into the district through the agency of infected articles contained among the spoil brought by the Cossacks from the seat of war.

The researches made concerning this matter have not led to any definite result. It is certain, however, that cloth and other textile articles found their way from Armenia to Vetlianka. An interesting example of this was ascertained by the priest at Prischib. A few days after the visit of his brother-priest

from Vetlianka, his sacristan informed him that he had found a bundle in the church, placed behind the picture of the Virgin, and containing an article of dress, which probably had been placed there as a votive offering. The priest opened the bundle carefully and found in it a silk dress of a dark red colour and of a nature unknown in the district. Remembering the statements about the mode of introduction of the plague into Vetlianka, he gave orders for the immediate destruction of the dress. It is further reported that the dress had been given to a girl who, accompanied by two bead-women, had visited Vetlianka where she received it, and where she had passed twenty-four hours in a house entirely free from the plague and had had no contact with any persons suffering from the disease. Four days after the return of these three individuals to Prischib, they sickened of plague, and on the same day their servants sickened who had not been in communication with any persons ill of the malady. The mother of one of the bead-women then took the dress, and deposited it in the chapel in the place above stated.

This seems a striking example of the transmission of plague by infected clothing, and it is possible that a similar mode of transmission may explain the appearance of the disease in Vetlianka. It may be assumed that isolated infected articles found their way from Persia and Mesopotamia into the Armenian bazaars, and becoming there spoils of war had fallen into the hands of Cossacks, and unopened were sent to Vetlianka, there to disgorge their infection when handled and spread out. This hypothesis would sufficiently explain the transmission of the disease and its limitation.

Another pregnant example of the transmission of plague through the medium of infected articles may here be noted—an example which occurred under our own observation. It refers to the last case which occurred at Vetlianka. A box containing articles of dress which had come from a house where about two months before all the occupants had died from plague, had been deposited in another house in the village. A child, ten years old, opened the box, which had till then remained untouched, and which, indeed, was about to be burnt, and took out a piece of dress with which she dressed herself. Four days after she ~~sickened with plague~~ sickened with plague. If this box had been carried to other

places, where the local conditions were favourable to the development of plague, the tragedy of Vetlianka would have been played over again. What here is indicated as possible, may have happened between Mesopotamia and Vetlianka through the agency of the Cossacks returning from Armenia.

But with regard to this hypothesis of the origin of the plague at Vetlianka, and other hypotheses, it must be remarked that exact data are wanting, and that the late arrival of the commissioners in the infected district precluded any close research into the earlier facts of the outbreak.

It is difficult to judge if meteorological conditions had anything to do with the beginning, course, and ending of the outbreak. The abatement of the sickness followed upon the setting-in of damp, mild, winter weather. I do not care to express an opinion upon the question, whether this change brought about the termination of the outbreak, or it had come to a natural end. Of the soil-relations to the spread of the disease the data are too imperfect to be worthy of consideration.

The last question for remark relates to the measures taken to limit the spread of the disease. It has already been stated that the outbreak at Vetlianka did not come to the knowledge of the governing powers until it had almost reached its height. A flying visit to the locality was then made by the principal medical officer of the Cossacks, and at the end of November he stationed a medical man there, who succumbed to the disease at the commencement of December. Then followed a second medical man, who died on the 18th of December; and afterwards a third, who at the commencement of January became a sacrifice to the plague.

These several gentlemen formed no clear opinion of the nature of the disease which came under their observation. At first the malady was considered to be a malarious fever complicated with buboes; then a severe form of typhus; and, again, it was declared to be a croupal pneumonia. Indeed, it was not until the 18th of December that, after a more thorough investigation, directed by the Governor of Astrakhan and carried out by the principal medical officers of the Cossacks and of the Government, that the nature of the disease was clearly discriminated. Then the sickness was declared to be of the nature of plague, and a sanitary

cordon was established round the spot. At the beginning of January a general cordon was formed around the whole of the plague-infected district, on both sides of the stream.

The measures adopted in the infected places were of a barbarous character. After the infectious nature of the disease had been determined, the houses within which there were sick persons were at once closed, and the unfortunate sequestered left to their fate. Those who complained of bodily ailment, particularly of headache, were at once removed to these pest-houses, and it can scarcely be doubted that many unfortunates were there first infected. Proper care of the sick under these circumstances was not to be thought of. Only persons made bold by brandy would undertake the duty of attendance upon them. The same was true also with regard to the burial of the corpses. There was a general dread of entering the infected houses. All neighbourly and even family ties were loosened, and scenes occurred which recalled the saddest pictures of the plague-epidemics of the Middle Ages. One fact alone need be mentioned, derived from the mouth of a sufferer, a girl of twenty years of age, who at the time of my visit was still suffering from a suppurating bubo in the groin. When the outbreak occurred in Vetlianka, she was living there in the house of a relation. She complained of a headache, and without delay she was despatched to a plague-infected house where there were seven persons sick of the disease. Soon after her transmission there she sickened of the disease, and several days afterwards, recovering from delirium, she found herself lying among seven corpses. She was freezing, as the cold was then great and the windows of the house had been broken. Hastily seizing the clothing lying about, she covered herself, and her cries attracted the attention of a man, whom she induced to take her out of the house. But by this time both her feet had become frozen. One of the most tragical events occurred in the family of the priest before mentioned, and who was destroyed by the plague in the middle of December. No one could be found to bury him, and his wife, a very weakly woman, and his sister had themselves to dig a grave in the hard-frozen ground, carry the corpse there, and bury it. A few days after both sickened of the plague and died. In other places also the cases of plague were treated in the same rigorous manner.

The houses containing the sick were immediately shut up, and the inhabitants left to their fate. Even localities free from the disease were isolated from neighbouring places, and here also many barbarous scenes were enacted. An attempted official supervision of these measures proved wholly a failure. The Russian local authorities stand doubly condemned for their conduct; they not only did nothing, but they even allowed these iniquities.

Scarcely had the Russian Government displayed this general activity in the province of Astrakhan when the neighbouring provinces on the Volga became alarmed, and petitioned that a scientific expedition should be sent to the plague-stricken district. At the commencement of February Count Loris Melikof was appointed Governor-General of Astrakhan with special powers, and then general sanitary measures were instituted. His activity was not limited to the perfection of cordons and quarantine and the sanitary management of the infected places, but extended to the entire province. He gave orders that in all places the streets and places should be cleansed, that the markets should be strictly watched, and above all that a sufficient quantity of disinfectants should be distributed. It is due to the Count to state that he fulfilled his functions energetically and conscientiously.

The quarantine arrangements, it is understood, were very primitive, as they were made in the greatest haste. The persons in quarantine were crowded together; no separation was made of the arrivals at different dates; and if the plague had happened to be spreading, great mishaps would necessarily have occurred.

With the cessation of the plague on the Volga in January can the disease be regarded as having become extinct? When the chronological relations of the plague in Vetlianka to the glandular malady in Astrakhan are considered, and now when it is reported that cases of the latter malady have again and lately occurred there, the probability cannot be excluded of a further serious outbreak of plague. Moreover, if, as seems probable, plague was carried direct from Armenia to Vetlianka, it is not beyond possibility that the latent plague-germs may again become active, and another outbreak occur. When the Russian Government has learned a lesson from the heavy sacrifice the

disease has subjected it to, and when the rules adopted in the infected district can be carried out thoroughly and conscientiously, then no dread of the further spread of the malady need be entertained. Only when the disease enters within the districts where active commerce is maintained, namely, when at Tsaritzin it touches the point of junction of the Volga navigation with the South Russian railway system, may an advance be looked for, dangerous to Russia and also to other countries of Europe. From a strict supervision of the places threatened with plague, and the diligent execution of a rational plan of isolation of the first plague-foci, we may secure safety. If no other lesson was learned from the late plague outbreak than the value of isolating localities as a means of preventing the spread of plague, then the victims of the pestilence have not fallen in vain.

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### AN ABSTRACT OF AN EXPERIMENTAL RESEARCH ON THE PHYSIOLOGICAL ACTIONS OF DRUGS ON THE SECRETION OF BILE.

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INTRODUCTION.—At the desire of the Editor I have prepared the following *abstract* of a lengthened experimental inquiry with reference to the physiological actions of drugs on the secretion of bile. The research was presented to the Scientific Grants Committee of the British Medical Association, and has already been published in full detail in the columns of the *British Medical Journal* for 1875, 1877, 1878, 1879, and will appear in a collected form in the forthcoming volume (vol. xxix.) of the *Transactions of the Royal Society of Edinburgh*. As the research is elaborate and its details numerous, an abstract will doubtless prove serviceable to the busy practitioner.

As the liver is an organ whose due activity is indispensable for the maintenance of health; as it is frequently the subject of disorder, and consequently receives a large share of attention from the physician, it is obviously important that he should

possess precise knowledge of the manner in which it is affected by medicinal agents.

The physician has had no difficulty in ascertaining when a substance excites the sweat glands, the salivary glands, or the kidneys, but as regards the liver he has been so much embarrassed, that although substances supposed to increase the discharge of bile have been administered to man for over 2,000 years, there has always been much uncertainty as to those which are really to be regarded as cholagogues; and even in the case of any agent which increases the discharge of bile, he has been quite unable to determine whether this effect is due to a stimulation of the *bile-secreting* or of the *bile-expelling* mechanism.

The reasons for these uncertainties are not difficult to find. The bile, when it enters the intestinal canal, mingles with other secretions, and with alimentary substances, whose quantities are variable. The physician roughly estimates the amount of bile discharged, by observing the colour of the dejections—a method which is of necessity so inaccurate that it is often difficult, sometimes indeed impossible, to say whether or not the discharge of bile is increased, diminished, or unchanged. Thus when rhubarb is administered, it gives a colour to the dejections similar to that communicated by the bile, and the physician is therefore puzzled to say whether or not rhubarb affects the liver; yet, by another method of research, it can be shown that rhubarb increases the secretion of bile. Where the substance, as in the case of sodium sulphate, stimulates the intestinal glands and thus occasions copious dejections of a watery character, whereby their colour is diluted, the physician has found it difficult to say whether or not there is a variation in the quantity of bile discharged; yet by another method it can be shown that this substance certainly stimulates the liver as well as the intestinal glands. Again, in the case of such substances as magnesium sulphate and castor oil, which stimulate the intestinal glands but not the liver, the physician, although he certainly did not suppose that they increase the flow of bile, nevertheless failed to observe the fact—which may be shown by another method—that *they diminish the production of bile*. Again, when a substance excites the liver to produce more bile, but does not excite the intestinal glands to pour forth their

watery secretion, and as it were wash out the bile discharged into the canal, the clinical observer has in the case of benzoic acid and its compounds, sodium salicylate, and other substances, failed to observe that they are cholagogues. But again, the clinical observer is unable to say whether or not any cholagogue actually stimulates the hepatic cells to produce more bile, or merely excites the muscular fibres of the gall-bladder and bile-ducts to expel their contents. Yet rational medicine imperatively requires that the first of these questions at all events shall receive a definite answer.

There are two methods—the clinical and the physiological—by which the actions of medicinal agents are investigated. On the clinical method, experiments are made on men and animals in a state of disease, with a view to cure the diseased condition ; whereas, on the physiological method, experiments are made with drugs on animals and sometimes also on man in a state of health, with a view to determine how they affect the bodily system when its action is not distorted by the influence of disease. The clinical method is as old as medicine itself, but the physiological mode is of comparatively recent date, and has grown out of the fact that the clinical method has proved to have very seriously failed—and nowhere more signally than in the case of the liver—to furnish the physician with that definite knowledge which is required to bring therapeutics even within sight of the pale of exact science.

Of necessity the influence of a drug upon a diseased condition is the ultimatum of pharmacology, and every experiment upon a healthy bodily system, whether of man or animal, is merely ancillary to experiments with the drug in disease. Therefore, if we discover that a drug stimulates the healthy liver of such an animal as a dog, we do not infer that it must also stimulate the human liver in health, and still less do we conclude that it must also act thus in disease. The experiments on the healthy liver of the dog, on the normal, and on the abnormal human liver, are *three sets of experiments* closely related, but still distinct. The facts derived from any one of the three cannot be substituted for those of the other two. Each set of facts has its own proper place, and must be carefully kept there. When, therefore, we show by the physiological method that

such substances as sodium benzoate, sodium salicylate, ammonium phosphate, and others, powerfully stimulate the liver of a dog, we do not for a moment say to the clinical observer, you will find that these things have a similar action in man. We merely say it is likely that they also act thus in man; experiment with them in his case, and tell us if you find that they have on him a similar action, and tell us also in what diseased states you find the employment of this or of that substance most advantageous.

All are agreed that medical science has much to gain from the attainment of a precise knowledge of the physiological actions of medicinal agents. The action of ipecacuan in dysentery is an apt illustration of this fact. On asking a highly experienced Indian physician how he explained the appearance of a large amount of bile in the dejections after the administration of sixty grains of ipecacuan in cases of dysentery, he at once replied, "My theory is that it relieves a spasm of the bile-ducts, and thus allows of the escape of pent-up bile." But, when we give sixty grains of ipecacuan to a healthy dog, it never fails to cause the liver to secrete a greatly increased quantity of bile. Probably, therefore, no one will now be inclined to doubt that in dysentery, ipecacuan affects the liver in a similar manner, and that the increased discharge of bile is due to its increased secretion, and not the relief of an imaginary spasm of the bile-ducts. It must be admitted that the attainment of this precise knowledge regarding the action of ipecacuan does not reveal to us the true pathology of dysentery, but it places us one step nearer to a knowledge of it; for, once we know the action of a drug in a healthy state of the body, and find that a diseased state is cured by that drug, our knowledge of the nature of the diseased state is necessarily advanced.

While all have admitted the limited and unsatisfactory character of our knowledge of the effects of drugs on the liver, several investigators have attempted to advance the subject by the physiological method of experimenting with drugs on animals. Nearly all the observations have been made on the dog—that being the animal best suited for the purpose. The method resorted to by the earlier experimenters was that of continuously collecting the bile from a *permanent* biliary fistula,

and observing how its amount and composition were affected by drugs. A permanent biliary fistula is established by occluding the common bile-duct, and establishing a communication between the fundus of the gall-bladder and the exterior of the abdomen. When the wound in the abdominal wall has completely healed, and nothing remains but the fistulous opening into the gall-bladder, through which all the bile is necessarily discharged, a cannula is placed in the fistulous opening, and the bile collected either in a bag attached to the cannula, or in a large sponge placed in a tin box and secured to the abdomen of the animal. The difficulty of perfectly collecting the bile continuously day and night, while allowing of such freedom of movement on the part of the animal as is necessary for the maintenance of its health, is so serious that few investigators have succeeded in accomplishing the task. By this method Nasse, Kolliker and Müller, and Scott, severally made observations on a single dog with reference to the effect of calomel on the biliary secretion. Being in some measure contradictory, the subject was in 1866 taken up by a committee, of which the late Professor Hughes Bennett was chairman and reporter. The method adopted by Scott and others was again employed, but although the committee pursued the subject in a much more elaborate manner than had been previously done, and although the research lasted two years, it must be admitted that it did not greatly advance our knowledge of the subject. The method of experimenting with *permanent fistulæ* was insufficient.

In 1873 Röhrig reopened the investigation of this subject. He observed the rate of biliary flow from *temporary* fistulæ in fasting curarised dogs before and after the injection of purgative agents into the stomach or intestine. He found that large doses of croton oil greatly increased the secretion of bile, and that a similar effect, though to a less extent, was produced by colocynth, jalap, aloes, rhubarb and senna, and sulphate of magnesia—the potency of these agents as stimulants of the liver being in the order mentioned. He found, moreover, that castor oil had little effect, and that calomel, while it seldom recalled the biliary secretion after it had ceased, nevertheless somewhat augmented it when it was taking place slowly.

The statements that croton oil is a powerful cholagogue and

that magnesium sulphate is to be regarded as a stimulant of the liver, appeared to me so opposed to the experience of physicians, that they could not be allowed to pass unquestioned. It further appeared to me that the method of experimenting with *temporary* fistulæ on animals fasting and curarised was worthy of a more extensive trial, and was capable of being used in a manner far more refined, and of yielding results far more precise than had been obtained by Röhrig. I therefore entered on the following research, but ere I had proceeded far I found its labours so excessive, that I was glad to avail myself of the valuable assistance of my pupils, Monsieur W. Vignal, and latterly of Dr. William Dodds, in performing the experiments.

METHOD OF EXPERIMENT.—All the experiments were performed on dogs. The dog was selected—1. Because the size of its common bile-duct renders it possible to introduce a cannula with an orifice sufficiently large to prevent its being blocked up by particles of inspissated mucus from the gall-bladder. 2. For the reason that its digestion resembles that of man, inasmuch as its stomach becomes empty when the process is completed. It is very different in the case of a rabbit, whose stomach is never empty. 3. As Röhrig had performed his experiments on dogs, it was necessary that we should compare our results with his. The selection of the dog has proved fortunate, for the results of our experiments are in complete harmony with every perfectly ascertained fact regarding the actions of medicinal agents on the human liver, and prove that the liver of this animal is affected in the same sense—although it may not be to the same degree—by substances that act on the human liver. All the experiments having been performed on animals of the same species, placed as nearly as possible under similar conditions, the results are fairly comparable; although it must be borne in mind that just as no two members of the human species can even in their normal condition be regarded as equally susceptible to the influence of any medicinal agent, neither can any two members of the canine species be held to possess identical susceptibilities. All the animals had a full meal of lean meat at three or four o'clock in the afternoon, and the experiment was begun between nine and ten o'clock on the following morning,

so that the digestion and absorption of the food were completed, and the animal was therefore in a fasting condition. This was an essential preliminary; for, as is well known, the secretion of bile is accelerated during the process of digestion, and had we taken the amount of bile secreted per hour during digestion as an index of the activity of the liver, previous to the administration of a drug, our experiments would necessarily have been worthless. The disturbing effect of irregular muscular movements upon the biliary flow was prevented by injecting into a vein small doses of curara, repeated at intervals, when the motor paralysis which it induces became too slight. In consequence of the curara palsy, artificial respiration was had recourse to, and maintained at regular intervals throughout the whole experiment. Chloroform was used during the preliminary operation in two cases, but the stimulation of the liver which it induced rendered the experiments worthless. On the other hand, we have abundantly proved that the doses of curara administered in the following experiments have no influence on the biliary secretion, and do not interfere with the effects of hepatic stimulants. It is, therefore, an exceedingly valuable auxiliary in a research of this nature. The method of experiment we adopted was always that of *temporary* biliary fistulæ. Through an opening in the linea alba a glass cannula was inserted into the common bile-duct near to its junction with the duodenum, and tied therein. To the end of the cannula projecting from the abdomen a short caoutchouc tube was attached, and to the free end of this a short glass tube drawn to a narrow aperture so that the bile might drop from it, as Röhrig had recommended. The gall-bladder was then compressed, in order to fill the whole tubing with bile, and the cystic duct was clamped to prevent its return to the gall-bladder, and so compel all the bile secreted by the liver to flow through the cannula. The wound in the abdominal wall was then carefully closed, and in all save the earliest experiments the animal was thoroughly covered with cotton wool, in order to quickly restore it to its normal temperature; and guided by a thermometer in the abdominal cavity, great care was taken to keep the temperature normal,—a matter of no small importance, for if the temperature fall several degrees, the liver secretes more slowly.

Röhrig estimated the velocity of the biliary secretion by counting the seconds that elapsed between the fall of the drops from the orifice of the tube. A single trial convinced us that this method is extremely laborious, and leads to inaccurate results, because it does not permit of continuous observation for any length of time. Variations in secretion often occur independently of the administration of any substance, and it is impossible to estimate their significance, and make due allowance for them, unless the method of continuous collection of the bile be adopted. Moreover, we saw that the degree of viscosity of the bile caused a variation in the size of the drops, and, therefore, in the intervals between their fall. We therefore abandoned this for the more accurate method of allowing the bile to flow into a fine cubic centimetre measure, and recording the quantity secreted every quarter of an hour. In addition to constant collection of the bile, this method had the advantage of allowing us to ascertain the co-efficient of the secretion of bile, that is, the amount of bile secreted in a unit of time, for every unit of the body-weight of the animal. In a research of this nature it is absolutely necessary to ascertain the co-efficient of secretion in order that a real knowledge of the activity of the liver may be obtained, and the powers of different stimulants compared. By neglecting this, Röhrig failed to obtain results of substantial value. The method of *continuous* collection is so simple and satisfactory, that it is surprising that Röhrig should have adopted the old method of counting the drops of bile.

It is evident from the method of experiment, that all our observations relate exclusively to the effects of substances on the *bile-secreting* mechanism. We have made no observations regarding their effects on the *bile-expelling* mechanism. Nor do we intend to prosecute the latter part of the inquiry, for the question, What substances stimulate the liver to secrete more bile, is of infinitely greater importance. We shall be able to give to it a precise answer, and thus for the first time to furnish the physician with definite knowledge for his guidance in the treatment of hepatic disorder.

In several instances we analysed the bile secreted before and after the administration of a drug, but although interesting facts

were thus ascertained, we found that in consequence of the excessive labour of this research it was impossible to analyse the bile in all cases. We therefore discontinued the analyses, after observing that even when a hepatic stimulant renders the bile more watery, the increased velocity of secretion always more than compensates the diminution of the solids, and thus compels the liver to produce in a given time a larger amount of the biliary constituents proper.

We were also at the pains to make in most cases *post-mortem* examinations of the small intestine, and sometimes of the large intestine and stomach, in order to compare the effect of the drug on the liver with its effect on the intestine. The results are valuable, because—1. They furnish for the first time a systematic account of the effects of well-known and also of many new drugs upon the intestinal mucous membrane. 2. By separating the secretion of the liver from that of the intestinal glands a more exact knowledge of the effects of substances on the latter is obtained; and a very important generalisation regarding the effect on the secretion of the bile, produced by stimulating the intestinal glands, has been arrived at, as will be shown in the sequel. It ought to be observed that some of the substances might perhaps stimulate the pancreas, and as the pancreatic duct was never tied, the fluid in the intestinal canal may have been a mixture of intestinal and pancreatic juices. But as the liver was the primary object of our investigations, it would have been altogether unjustifiable to have set up more irritation at the duodenum, by cutting down on the pancreatic duct and placing a cannula in it—always a difficult thing to do in the dog, and apt to involve a good deal of hæmorrhage. Although by such a procedure, definite knowledge might have been arrived at with regard to what substances affect the pancreas; yet our results as regards the liver might have been vitiated. Probably in most cases the fluid found in the intestine was chiefly intestinal juice, but for the reason mentioned, no conclusive statement is permissible with regard to this point.

The small doses of curara given to the animals were injected into the jugular vein, in order that their effect might be speedy; but nearly all the drugs given for the purpose of affecting the liver or intestine were injected into the duodenum, because

the animals being curarised could not swallow, and the penetration of the duodenal wall by the sharp nozzle of a small syringe was a much simpler operation than the introduction of a tube down the œsophagus into the stomach. Moreover, the stomach in a dog that has fasted for many hours usually contains a large quantity of mucus that must have retarded the absorption of the substance if given by the mouth. To avoid this delay was a matter of great importance, both on the animal's account, and also because of the impossibility of continuing the experiment for more than a few hours. Moreover, it has been alleged that the action of a cholagogue may be due to a reflex excitement of the liver proceeding from the duodenal mucous membrane: therefore by always injecting the substance into the duodenum we ensured its action—if any—on this portion of the intestine. It must of course be borne in mind, that when a drug is placed in the duodenum directly, and a certain effect on the liver ensues, it by no means follows that the same effect will accrue if the drug be placed in the stomach and thus come in contact with the gastric juice. But the general harmony of the results of our injecting substances into the duodenum, with those observed in man when the drugs are taken by the mouth, convinces us that our method is reliable. In only one instance, indeed—that of calomel—did it seem probable that its having escaped the influence of the gastric juice was vitiating the result, for the hydrochloric acid of the juice can convert calomel into corrosive sublimate; and we have discovered that while *calomel does not, corrosive sublimate does, stimulate* the liver. That case will be alluded to in the sequel, and we think it the only one that needs special consideration.

SECRETION OF BILE IN A CURARISED FASTING DOG.—It was of course necessary—as a preliminary step—to observe the amount of bile secreted in the course of a day by a dog that had fasted about eighteen hours, and to which nothing but curara was administered. The solution of curara employed in all the experiments was an aqueous solution. About twenty milligrammes were injected at the beginning of the experiment, and from two to six milligrammes were afterwards given as occasion required. In three preliminary experiments it was found that these doses do not affect the secretion of bile, which in a dog that has previously

fasted eighteen hours remains fairly constant during the first five or six hours of the experiment, and then falls slightly, as two or three hours more are permitted to elapse. The amount of bile secreted every fifteen minutes was recorded, and the amount secreted per hour was compared with the weight of the animal, so that the coefficient of secretion might be obtained. The quantities secreted every fifteen minutes were also recorded in the form of a curve, so that, from the graphic representation, an idea of the results of the experiment might be readily obtained. It is, however, necessary in this abstract to omit the woodcuts and the tables of figures, and merely to state the general results, leaving the reader to consult the original memoir for fuller details.

CROTON OIL.—As Rührig placed croton oil at the head of his list of hepatic stimulants, we made it the subject of three experiments which convinced us that this substance so slightly stimulates the liver that its effects thereon are unworthy of attention. We are obliged to conclude that Rührig's method of counting the drops of bile must have led him into error regarding the action of this substance.

MAGNESIUM SULPHATE is another substance which, according to Rührig, is a stimulant of the liver, though a feeble one. Two experiments with this substance convinced us that this is an error. So far from increasing, it *diminishes* the secretion of bile. In one of the experiments doses of sixty grains were given at intervals varying from half an hour to an hour, and finally a dose of 120 grains was administered. Powerful purgation ensued, but the bile-secretion fell.

SULPHATE OF MANGANESE is stated by Ure to be a cholagogue as well as purgative when given to man in doses of from 60 to 120 grains. Dr. R. H. Goolden states that in doses of from 10 to 20 grains it produces large bilious evacuations. Two experiments proved that in the dog sulphate of manganese stimulates the intestine but not the liver. As is the case with sulphate of magnesia the bile-secretion is diminished. Dr. Goolden has, however, explicitly stated that sulphate of magnesium does not in a man produce the same results as sulphate of manganese. Of course we cannot, from our experiments, deny that the manganese salt is a cholagogue in man; but,

looking to the general harmony between our observations on the dog and those on man, we think we are entitled to throw very grave doubts upon the idea that manganese sulphate excites the human liver. It might, however, be maintained that it has the power of inducing contractions of the gall-bladder and larger bile-ducts, and of thus increasing the amount of bile in the dejections; but we can only commend to the attention of physicians Dr. Goolden's positive observations as to the increased amount of bile in the dejections of man, and our negative results as to any stimulating effect on the bile-secreting mechanism of the dog.

CASTOR OIL was found by Röhrig to have little effect on the bile-secretion, but two experiments with doses which produced purgation proved that the secretion of bile is diminished when the purgative effect becomes fully established.

AMMONIUM CHLORIDE.—According to Garrod's *Materia Medica*, chloride of ammonium is "by some considered a cholagogue." The most valuable evidence which we have regarding the action of this substance is that furnished by Dr. Stewart of Brecon. The large experience in the treatment of hepatic affections acquired by Dr. Stewart in India has led him to regard ammonium chloride as an invaluable agent in the treatment of acute hepatic congestion, chronic hepatitis, and in "torpor of the liver," associated with congestion of the organ and lithæmia. Many such cases he has seen cured by from ten to twenty grain doses, given twice or thrice daily, with attention to diet, rest, and such other general indications. The drug produces diuresis, a sensation of warmth beginning in the epigastrium and gradually extending over the whole body, diaphoresis, exhilaration of the nervous system, and an undoubted effect on the liver, as shown, not only by the gradual disappearance of the symptoms referable to hepatic congestion, but by other and more immediate signs, "peculiarly and directly referable to the liver and related parts." Thus, within five minutes or half an hour after a dose of the salt, the patient may experience one or more "shocks" as of "something giving way," or a "pricking," or "gnawing" sensation in the hepatic region. In addition to these, a full dose increases intestinal peristalsis, "as evidenced by the twisting and other movements experienced in the situation of the duodenum,

or all over the abdomen, and which, at times, are more sensibly felt in the situation of the umbilicus, or in the inguinal region. The abdominal muscles may also be thrown into tonic contractions, which are perceptible at times to both sight and touch. 'Torpor of the liver,' and functional derangements attended by lithæmia (Murchison), associated with congestion of the liver, want of sleep, and depression of spirits, are benefited in a remarkable manner by a course of ammonium chloride, with careful attention to diet and regimen." In such cases, he has known a few twenty-grain doses of the salt "remove symptoms of disordered liver, restore sleep, and revive the drooping spirits, after the failure of other remedies." Dr. Stewart, however, nowhere says that he ever observed any cholagogue effect of this remedy.

Two experiments with this substance enable us to say that in the dog it does not stimulate the liver. In the case of a small dog we gave eighteen grains in three successive doses of six grains, and decided hydrocatharsis ensued. The only result was diminished secretion of bile. In the case of a large dog, 130 grains were given, in successive doses of ten, twenty, forty, and sixty grains. The purgative effect was moderate. The bile secretion was at first unaffected, but afterwards fell.

GAMBOGE is by no one said to be a cholagogue, still we used it in two of our earlier experiments for the purpose of ascertaining how the liver would be affected by a substance which powerfully irritates the duodenal mucous membrane. In one experiment small doses of gamboge were repeatedly injected, and although the irritation of the mucous membrane of the duodenum and remainder of the small intestine was very marked the bile-secretion simply fell as the hydrocatharsis set in. This and several other experiments proved that duodenal irritation is *not of necessity followed by excitement of the bile-secreting mechanism.*

HEPATIC DEPRESSION FROM INTESTINAL STIMULATION.—The results of our experiments with sulphate of magnesia, castor oil, chloride of ammonium, and gamboge show that when a substance stimulates the intestinal glands, but not the liver, hepatic action is depressed, and the production of bile is lessened. We invariably observed that, while slight purgation

—by a purely intestinal irritant—scarcely, if at all, depressed the secretion of bile; powerful purgation produced a very marked effect. Why is the action of the liver thus depressed? In our experiments, we had to deal with fasting animals, whose intestinal canals contained neither bile nor food. Under such conditions, magnesium sulphate could not depress the bile-secretion by diminishing the absorption of substances that augment the formation of bile. Its depressant effect seems, therefore, to be indirect, and attributable either to a drain from the portal blood of bile-forming substances, or to an excessive lowering of the blood-pressure in the liver, as in the system generally, by a large dilatation of intestinal and mesenteric vessels. But when such a purely intestinal stimulant as magnesium sulphate is given to an individual under ordinary circumstances, it doubtless depresses the secretion of bile; not only in the manner just indicated, but also by hurrying out of the intestinal canal substances which would otherwise have been absorbed and would have assisted in the formation of bile. Thus it cannot be doubted that, when the bile is prevented from entering the intestinal canal, less bile is secreted by the liver, and there is ample reason for believing that about seven-eighths of the sulphur daily secreted by the liver is re-absorbed from the intestinal canal by the portal vessels—in the form of some sulphur-containing substance derived from the decomposition of taurocholic acid—the sulphur-containing acid of the bile. *And it may be that, in abnormal states of the intestinal contents, various deleterious matters may be absorbed, and hamper hepatic action.* Therefore, it is reasonable to suppose that a purely intestinal stimulant, such as magnesium sulphate, although it does not stimulate the liver, may nevertheless in some abnormal conditions exercise an important influence on that organ, by removing deleterious matters from the intestinal canal, and by draining the portal system. We believe, then, that by the discovery of the depressant effect on hepatic action of purely intestinal purgatives, we have furnished the physician with a fact which will not fail to be of service in rational therapeutics.

The depressant effect on hepatic action of substances which excite the intestinal glands has to be carefully regarded in the case of many agents whose molecules stimulate the liver as

well as the intestine, for in such a case the stimulation of the liver has in a measure, as it were, to contend with the stimulation of Lieberkühn's glands, and if the effect on the latter be violent, the excitement of the liver may be slight, may soon disappear, or may not be observed at all. Our experiments with podophyllin proved this in a striking manner.

RESINA PODOPHYLLI is a very powerful hepatic as well as intestinal stimulant. Its effect on the intestinal mucosa is so irritating, that it seems feasible to regard it as contra-indicated in cases where there is a tendency to irritation of that membrane. If the dose be too large, and violent purgative action ensues, the secretion of bile, so far from being increased, is diminished. With a smaller but still too powerful purgative dose, the bile-secretion, though it may be powerfully raised for a short time, quickly falls as the substance passes down the intestine and induces secretion from a greater and greater number of Lieberkühn's glands. With somewhat smaller doses the increased bile-secretion is much more prolonged, although the hepatic excitement is not so intense at the outset as in the preceding case. It is manifestly of great importance to keep these facts in view in practical medicine.

It seemed to me desirable to test the action on the liver of some substances used by the American "Eclectics," and I selected the following: euonymin, iridin, leptandrin, sanguinaria, baptisin, phytolaccin, hydrastin, and juglandin. These substances are prepared by Keith and Co., and by Tilden and Co., of New York. They are not active principles but only impure resinous matters. Messrs. Keith have informed me that the crude roots of the plants are dried, crushed, and percolated with alcohol. The alcohol is then evaporated or distilled off, leaving the active principles in the form of an extract, which is then "freed from impurities," dried, and pulverised. How it is freed from impurities is not stated.

RESINA IRIDIS AND RESINA EUONYMI, OR "IRIDIN" AND "EUONYMIN."—These two substances are prepared respectively from the roots of the *Iris versicolor* and *Euonymus atropurpureus*. Both powerfully stimulate the liver, while they do not powerfully stimulate the intestine of the dog. Although not so powerful as podophyllin, they will both doubtless be preferred in many

cases to that substance, because of their far milder excitement of the intestine. For not only is the latter in most cases advantageous on its own account, but also because the action on the liver is far less liable to be hampered and diminished by the intestinal stimulation. This, as we have seen, is apt to be the case with podophyllin. Our experiments on the dog led us, and have led many others, to try the effects of these substances on man, and they are of great value. The average dose of iridin is four grains; of euonymin two grains. In either case two grains of extract of hyoscyamus should be added, and taken at bedtime, for without this some persons experience griping. Neither substance produces headache or any sickness. In some persons the above doses of both substances produce a sufficient purgative effect; but in other cases the purgation is insufficient or delayed, and griping is then apt to ensue. The most beneficial result is obtained by following the dose of these remedies by a mild saline aperient, such as Pullna or Carlsbad water, on the following morning, so that the bile secreted during the night may be fully and quickly removed. I have in my own case noticed slight depression after four grains of iridin, which I never observed after two grains of euonymin. I therefore inferred that the latter is preferable when repeated stimulation of the liver is desirable. It is however important to remember that although euonymin usually suffices to quickly remove a slight feeling of biliousness; iridin is, I am convinced, the more powerful remedy of the two, when the tongue is decidedly yellow. I have in such a case been more than once surprised to find that on awaking in the morning after taking four grains of iridin the previous night the yellow tongue and the bilious sensations were entirely gone. Since the publication of our results these remedies have come into very general use. Mr. Hardyman,<sup>1</sup> of Cardiff, states that he has used euonymin in two-grain doses at bedtime in over fifty cases of biliary derangements and sick headache, and finds it of much value. Finding that in most cases one dose is insufficient he gives two grains at bedtime on two successive nights, following it each morning with a saline purge.

RESINA HYDRASTIS, OR "HYDRASTIN."—The root of the *Hydrastis*

<sup>1</sup> *British Medical Journal*, July 12, 1879.

*canadensis* is admitted by all to be tonic, and by some it is said to be aperient, cholagogue, diuretic, antiseptic, &c. "It has been employed in dyspepsia, and other affections requiring tonic treatment, in jaundice and other functional disorders of the liver, as a laxative in constipation and hæmorrhoids, and as an alterative in various diseases of the mucous membranes, such as catarrh, chronic enteritis, &c. By some it is used as one of the best substitutes for quinia in intermittents." These and other statements regarding it are made by Wood and Bache, who further aver that a "more precise investigation of its physiological and therapeutic properties is necessary before we can venture to decide its place among medicines." It contains an alkaloid, hydrastia or hydrastin, which has been found to be identical with berberin. The "hydrastin" employed in our experiments was not the alkaloid, but a resinous substance prepared from the root of the plant by Keith and Co. The dose for a man of this preparation is from one to two grains. Our experiments prove it to be a moderately powerful stimulant of the liver and a feeble stimulant of the intestine. Considering also its tonic properties, it seems to be a substance eminently worthy of the attention of the practitioner.

RESINA JUGLANDIS, or "Juglandin," is an impure resin prepared as above from the root of the butter-nut (*Juglans cinerea*). Regarding the properties of the bark of the butter-nut, Wood and Bache state that it is a mild cathartic, operating without pain or irritation, and resembling rhubarb in the property of evacuating without debilitating the alimentary canal. It was much employed during the late American civil war by Dr. Rush and other army physicians. It is especially useful in habitual costiveness and dysentery. Nothing is stated regarding any influence on the liver. An extract of the bark is officinal in the United States. The dose of Keith's juglandin—the substance used in our experiments—is from two to five grains. In the dog it is a moderately powerful hepatic and a mild intestinal stimulant. It seems to be worthy of the practitioner's attention.

RESINA BAPTISÆ, or "Baptisin," is prepared as above from the root of the wild indigo (*Baptisia tinctoria*). The root of this plant is said to be a powerful emetic and cathartic in large, and a mild laxative in small, doses. Stevens of Pennsylvania

recommends a decoction of the root in epidemic dysentery. It is said to have proved useful in scarlatina, typhus fever, and in that state of the system that attends mortification. The physiological actions of this plant have apparently not been investigated, and it is nowhere stated that it is a cholagogue. The dose of baptisin for a man is from one to five grains. Our experiments prove this substance to be, in the dog, a hepatic and also an intestinal stimulant of moderate power. It may possibly be found of service as a hepatic stimulant in cases of torpid liver with a depressed condition of the system tending to gangrene. We commend it to the attention of the physician.

*(To be continued.)*

## CASES OF HYSTERIA IN BOYS.<sup>1</sup>

BY WM. ROBERTS, M.D., F.R.S.,

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ALL modern authorities formally acknowledge the occasional occurrence of hysteria in persons of the male sex, and a good number of examples may be found on record in odd nooks of medical works and journals. But it is curious to note the almost uniform reluctance of the writers to designate such cases by their right name; they are nearly always described under some anomalous title. Some years ago I myself published an account of a boy, whom I should not now hesitate to call an example of hysterical feigning, under the heading of "Motiveless Simulation of Disease." Dr. Russell Reynolds has recorded an exquisite case of hysterical paralysis in a boy, under the title of "Paralysis Dependent on Idea." Even Dr. Wilks, who, in his recently published lectures on nervous diseases, devotes a separate sub-section to "Hysteria in Boys," has evidently not the courage of his opinion; for, under the heading "Tetanilla," he reports a case of convulsive disorder in a boy, which, I think, he would not have hesitated a moment to call hysteria had the patient been a young woman. I could, if needful, greatly multiply examples of a similar kind. This reluctance obviously arises from the sexual associations of the name hysteria, which unconsciously influences our minds, and hinders our apprehension of the true affinities of this class of cases. I propose to recur to this point at the close of my paper; in the meantime I proceed to the recital of my cases of hysteria in boys. I do not bring them forward as anything new, but rather as a reminder to you—as they have been to me—of the oft-forgotten fact that hysteria is neither a disease of a particular organ nor of one sex.

<sup>1</sup> This Paper was originally read at a meeting of the Manchester Medical Society.

CASE I.—The first example of hysteria in boys that arrested my attention was the son of a merchant in this town, whom I saw in 1870. This boy, at the age of thirteen, and as a sequence to some trifling ailment, began to show hypochondriacal symptoms. He became depressed in spirits and dyspeptic, and suffered from various undefinable ailments. Eight months later a dry cough set in, which soon assumed the character of the true hysterical bark. I was consulted some four months after this began. The bark had now degenerated into a hoarse sound, resembling the bleating of a goat. The boy persisted for many months in uttering this horrible noise all day long almost without cessation, except during the hours of sleep. At one time—for about four months—the symptoms exhibited a curious diurnal periodicity. As soon as the boy awoke in the morning he began to bleat every two or three minutes, and continued to do so for about three hours, and then ceased; but precisely at eight o'clock every evening, with the regularity of clockwork, he began to bleat again, and continued to do so until he went to bed and fell asleep. These symptoms went on altogether for a period of fifteen months, and then gradually subsided. Since then this boy has grown into a fine strong young man. There could be no doubt as to the hysterical nature of the symptoms in this case. The patient was seen by Gendrin in Paris, and by Sir William Gull, both of whom pronounced the case to be one of pure hysteria. An interesting episode occurred during the progress of the case. The boy was separated a good deal from his brothers and sisters during the continuance of his ailment, but on one occasion he passed some days in the society of his elder brother. Some four months afterwards this brother had an attack of hysterical barking, which lasted a fortnight and then passed off. A sister also was subsequently seized with similar symptoms. She was nine years of age when her second brother—the subject of this history—was suffering from the above-described bleating. When she reached the age of fifteen—four years after her brother's recovery—she began to “bark,” and show other signs of hysteria. In her case the “bark” became a sort of hoarse growl, which continued almost without interruption for nearly three years, and then slowly passed away. In this family the hysterical bias was distinctly

inherited from the mother, who, in her youth, displayed severe hysterical symptoms of the classical type.

It is interesting to note in this family how hysteria moulds its manifestations, by unconscious mimicry, on a contiguous model. In all three cases the disorder affected almost exclusively the diaphragm and larynx, and almost exactly in the same fashion. This is quite in harmony with the history of this great neurosis. When hysteria breaks out—epidemically, as it were—in a school or in a nunnery, all the cases develop the same type of manifestations as those exhibited by the individual first attacked. This is not the case in untutored, sporadic hysteria, in which, on the contrary, the several cases present an infinitely varied and discordant order of symptoms. •

CASE II.—It has been remarked that hysteria not unfrequently first shows itself during that period of weakness which is associated with convalescence from an acute disorder. My second case is an example of this. The subject of it was a boy between eight and nine years of age, whom I visited last year with Dr. Mules of Bowdon. He was the second child in a family of six. Dr. Mules informed me that three weeks previously the boy was commencing to be convalescent from a febrile attack of doubtful character, when he was suddenly seized with paroxysms of loud, passionate, tearless crying, with incoherent ravings of a most alarming and distressing character. These paroxysms continued for nearly a week almost without interruption. At the end of this week they suddenly ceased, and the boy appeared almost quite well again. In a few days, however, they recommenced, but not so continuously. The paroxysms now lasted two or three hours, and recurred three or four times a day. In the intervals between them the boy appeared quite well—eating and sleeping and amusing himself like a boy in health. When I saw the patient he was in his bed-room, looking calm and collected, with a soft, smiling demeanour. Soon after we had descended into the sitting-room to hold our consultation one of the paroxysms broke forth, and we heard the boy screaming. We went up stairs into his bed-room and found the boy passionately crying and clinging to his mother—calling on her incessantly as if in the extremity of terror. Nothing could pacify him, and when we left the house the paroxysm was still

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proceeding. To my mind the attack had an unequivocally hysteric complexion. What else could it be? The symptoms evidently concerned—and concerned alone—the nervous system; and they resembled those of no disease in the nosological category except those of the chameleon of pathology—hysteria. As these paroxysms had now persisted without amelioration for a period of three weeks, in spite of the restoration of the general health, we decided to send the child away from home, in order to eliminate that most fruitful of all promoters of hysterical manifestations—home surroundings and sympathy. The interrupted galvanic current was also directed to be applied daily. Under this treatment the attacks soon became less and less frequent, and finally, in about six weeks, ceased altogether; and the boy has since then remained in perfect health. I must allow that the diagnosis in this case was not so plain and undoubted as in the preceding, but if any one doubts its correctness I would ask him this question:—Suppose he saw these symptoms in a young girl on the threshold of puberty, what would he call the disorder?

CASE III.—My third case furnishes, if I am not mistaken, an exquisite example of hysterical spasm or contracture. Early in 1878 I was sent for into the country to see a boy, eleven years of age, who was the seventh child in a family of eight. The following particulars of the case were supplied to me by the medical attendant:—A week previously the family were walking to church, when the father slightly chided this boy because he appeared to be turning in his toes. Thereupon the boy began to limp; in returning from church he limped so badly that the parents became alarmed, and, as soon as they reached home, sent for the family attendant. He found the boy lying on a couch, with the left foot strongly flexed inward, as in a case of extreme talipes varus. The boy was at once put to bed, and three days afterwards, no amendment having occurred, a surgeon from a neighbouring town was called in for consultation. It was found that under chloroform the joint became quite relaxed. A splint was applied to the outer side of the leg and the foot was tightly strapped thereto. Nevertheless the deformity continued without amelioration. When I visited the boy he was lying in bed, looking perfectly well and happy; but the left foot, in spite of

the splint, was inflexibly turned inward, and no effort I could make, even taking the boy unawares, had the slightest effect on its position. The child was a frank-looking, well-grown lad, and his father characterised him as a bold boy, with "no nonsense about him;" yet it was elicited that he was fidgety in his demeanour, and habitually displayed a certain muscular restlessness. There had never been any pyrexia, nor any pain, and the boy ate and slept well; but the spasm never relaxed an instant, not even during sleep. What was the real nature of the ailment?

It may be remarked of hysteria that, although it imitates every neurotic disorder, the imitation is never perfect. There is always wanting, either in the history or in the symptoms, some feature which is essential to the imitated disease. This case was an imitation club-foot, but no one ever saw true club-foot come on in this abrupt fashion without pain, convulsion, paralysis, atrophy, or associated symptom of any sort. I looked upon it as an instance of pure hysteria, and advised that the splint should be removed, that the boy should be dressed and brought down stairs, and encouraged to use the foot. The boy was also told confidently that he would soon be well and able to join his brothers and sisters in their play. The result justified the diagnosis sooner than I expected. The boy began to improve forthwith, and in twenty-four hours he was absolutely quite well, and walking about without the slightest limp, and has continued so since.

CASE IV.—The next case might be described as a clumsy imitation of epilepsy. The subject of it was a boy of eight, who came to me with his mother in May, 1878, with a note from Dr. Nesfield. The boy appeared healthy and well grown, and had a fond, caressing manner. He was the youngest of four children, and went to school, which he did not like. His ailment commenced in December, 1877, with irregular twitching of the arms and blinking of the eyelids. These symptoms gradually developed into paroxysmal attacks of a curious character. His mother described the attacks as consisting of convulsive fits of short duration—about a minute—suddenly developed, and suddenly ceasing. The movements appeared to extend all over the body; the boy never bit his tongue nor lips, nor foamed at

the mouth; the question of the preservation of consciousness was doubtful. The attacks, until recently, occurred solely at night in bed—a circumstance at first sight highly suggestive of true epilepsy, but latterly they occurred also in the day—eight or ten times each day and night. The mother—who had slept with the boy since these fits commenced—described the night attacks as follows:—The boy would suddenly rise from sleep on his hands and knees and shake all over, and sometimes attempt to get out of bed; in a minute or so the attack was over, and he would fall back again and go to sleep at once. By and by the attack returned—sometimes six or eight times in the course of the night. The attacks invariably occurred in the early part of the night, or after seven in the morning—never during the middle periods of the night when sleep might be assumed to be profound.

The day attacks were somewhat different. The mother described to me an attack which had occurred the previous day. The children were quietly having their tea with a couple of little cousins, when in an instant this boy started from the table and stood in the middle of the room, moving his arms and legs in a convulsive manner, and making horrible grimaces. The mother, in alarm, hurried the other children out of the room, and the boy at once became quiet and resumed his usual manner.

I am indebted to Dr. Nesfield for the subsequent history of the case. After his visit to me the boy became worse and showed new symptoms. He became almost completely mute. Excepting an occasional yes or no, neither relation, friend, nor stranger could get a word from him—the convulsive attacks still continuing. At a later period the seizures sometimes assumed more of the usual character of hysterical manifestations. On one occasion Dr. Nesfield found the boy screaming violently, and shaken with twitching and convulsive movements. In August, 1878, he was sent into Shropshire to a farm-house where there were other children. Here he made decided improvement, and on the 24th September his mother was able to report that the boy was quite well; he had not had an attack for three weeks. From this date no return of the symptoms took place. Now that the case is unravelled before you the diagnosis is plain

enough ; but it was not so when the boy sat before me with a history of convulsive fits, which occurred at night, and of which he remembered nothing in the morning. It required a troublesome analysis to arrive, in a single consultation, at the conclusion that the symptoms were purely hysterical. The occurrence of the night attacks finds its explanation in the fact that the boy slept with his mother. A hysteric, whether male or female, is essentially a performer, and, like other performers, must have an audience. The most inveterate hysterico-epileptic was never found in a fit in a solitary place where she was safe from being seen or heard. You may say that had not men and women been gregarious, the race would never have been afflicted with hysteria.

I shall make no further comment on these cases, but I should like to say a word about the name hysteria. It is one of the most ancient in nosology ; it has penetrated into every civilised language, it has passed into common parlance ; everybody grumbles at it, and nobody can get rid of it. Even as regards the female it is wholly misleading, for hysteria is, in its essence, a cerebral disorder. As applied to men it is a grotesque misnomer. Looking to the etymology of the term, it is as absurd to speak of hysteria in a man as it would be to speak of orchitis in a woman. And yet there is a sense in which its use may be justified. The complaint is distinctively a feminine complaint—I mean feminine, not in the sense of gender, but having regard to the whole feminine character. When men betray hysterical symptoms they may emphatically be said to “play the woman ;” and I know not whether—I commend the suggestion to evolutionists—the occurrence of hysteria in men is not as truly a “memory” of man’s hermaphrodite ancestor as the rudimentary nipples which adorn his breast.

It would be some relief to our sense of injured expressional propriety if we were permitted to use the word “hysteroid,” especially in regard to what is called “local hysteria.” It would at least grate less unpleasantly on the ear to speak of a “hysteroid” joint, a “hysteroid” stomach, and “hysteroid” manifestations in men and boys, than to use the word “hysterical” in the same connection.

## NOTES ON THE TREATMENT OF ECZEMA.

BY JAMES SAWYER, M.D., LOND., M.R.C.P.,

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IN failure to recognise the general constitutional condition with which the affection of the skin is associated, or in failure to treat it successfully, usually lies the cause of failure to cure a case of eczema. Eczema is nearly always a local expression of one of several diatheses, with which it is linked in intimate causal relation. Some local irritation may determine or keep up the local outbreak, and be its proximate cause; but it is only a concurrent cause. The proneness to the local malady, its remote cause, the reason why the local irritation results in eczema is to be found in some general constitutional abnormality. In the treatment of eczema we should always search for, and, finding it, endeavour to remove, any sources of cutaneous irritation, such as scratching, the wearing of flannel next to the skin, uncleanness, exposure of the affected part to the irritating action of heat, cold, water, urine, discharges, bad soap, or any mechanical or chemical irritant such as are met with in various occupations. But in the majority of cases no such external excitants are found; the eczema is merely the local expression of a constitutional vice: the cause is constitutional; why the lesion is cutaneous we do not know. To treat eczema successfully we must not concentrate our attention and our remedies on the eczema only; but, while adopting suitable measures for soothing and healing the inflamed skin, we must carefully study and favourably modify the diathetic condition which underlies the local mischief, and is its essential constituent.

The writings of Dr. Tilbury Fox, who brought to the study of dermatology not the narrow vision of the specialist but the broad insight of the cultivated clinical physician, are characterised by an enlightened recognition of the rôle of constitutional states in the causation of diseases of the skin; he did more, probably, than any recent writer to expound and explain the dependence of cutaneous disorders upon general abnormalities.

The most prominent and best recognised of the causal relationships of eczema are those it owes to struma and to gout. The eczema of infants, children, and young adolescents, especially when the discharge from the affected surface contains pus, is nearly always strumous, and yields only to cod-liver oil, iodides, iron, and suitable hygienic measures. Fox went further; he taught that "senile struma is an important state to recognise." On the other hand, the chronic eczema of middle and advanced life, especially in males, is commonly gouty, and is benefited by purgative mineral waters, Friedrichshall, Hunyadi Janos, &c., colchicum, iodide of potassium, alkalies, and lithia, and an arrangement of diet and exercise calculated to promote the excretion of uric acid. The nervous temperament often seems to have some pathological relationship with the gouty diathesis; we may see a gouty eczema suddenly aggravated by mental anxiety. Apart from gout and struma, a condition of "general debility," of nervous depression and general feebleness arising from worry or over-work, is often the chief factor in the production of eczema. Here iron, arsenic, rest and good food are needed. A troublesome form of chronic eczema of the legs is apt to arise in connection with chronic renal œdema of the same parts; in this association there is often a gouty element. Chronic eczema may have a syphilitic basis and yield to specific treatment. Eczema does not occur as a syphiloderm; but the chronicity of an eczema is often due to an unexhausted syphilitic taint, either acquired or hereditary. As illustrations of the dependence of eczema upon general constitutional states, I have only pointed out some of the more prominent etiological alliances of the malady; I might mention others, such as "sluggish liver," and gastric and bronchial catarrh.

One of the best local remedies for eczema is the ointment of oleate of zinc, for which the profession is indebted to Dr.

Crocker.<sup>1</sup> After using the preparation for several months, in a large number of cases both in hospital and in private practice, I have elsewhere ventured to express my testimony in its favour.<sup>2</sup> Some time ago, with the view of testing its action in the treatment of eczema, I desired Messrs. Southall of Birmingham to make for me an ointment of oleate of lead. After a series of experiments they produced an excellent ointment according to the following formula :—

Lead Oleate, 24 parts.

Heavy and inodorous paraffin oil, 14 parts.

The lead oleate is prepared by heating a mixture of oleic acid and oxide of lead. I can confidently recommend this ointment as a very efficient local application in eczema. I have used it successfully in a large number of cases. My house physician, Dr. Wood, informs me that he has cured many patients with it.

<sup>1</sup> *British Medical Journal*, October 26, 1878.

<sup>2</sup> *Ibid.* April 19, 1879.

## THE PRESENT AND PERMANENT TREATMENT OF DISEASE.<sup>1</sup>

BY J. MILNER FOTHERGILL, M.D.

WHEN the general practitioner is called in to see a new patient, he finds it expedient to provide immediate relief; if possible. If the case were one of his patients with whom he has become fairly well-known, and whose confidence he had previously gained, his practice would perhaps be somewhat different; and would be directed to the more permanent interests of the patient, rather than the immediate present. Say he is called in to see a case of early phthisis where the cough is troublesome, causing the patient much discomfort; and yet the cough is fruitless as to any removal of the exciting cause of the cough, viz., the new products in the lung. The first impulse is probably to give some preparation of morphia or opium—say paregoric with some spirits of chloroform; given to make it more agreeable, in mint water. Probably most of us would regard this as the most appropriate thing to be done; and our proceeding would in all likelihood be followed by the relief of the patient's sufferings, the gratitude of the friends, and an increment of reputation to the practitioner for his skill and capacity. Yet it may be questioned whether this treatment may not be directly injurious to the patient's true interests; especially if continued. As to the expediency of it at the time, probably no two opinions exist. But the danger lies in the very fact that immediate relief is so afforded; and that the patient in consequence has a decided liking for the medicine, and is indisposed to give it up for something else, the good effects of which are not so quickly manifest. The practitioner is conscious

<sup>1</sup> Read before the Harveian Society, Oct. 16th.

that while the opium allays the cough, it also exercises its effects upon the stomach; by blunting the terminal ends of the gastric nerves the sensation of appetite is lessened, and the inclination to take food diminished. It also influences the nerve-ganglia along the intestinal canal, and in doing so checks the peristaltic movements; and thus locks up the bowels. It thus strikes directly at one of the most important matters in pulmonary phthisis, namely the keeping up the nutrition. Further opium excites the action of the sudoriferous glands, and so adds to the exhausting night-sweats which the patient probably has. Profuse sweating is justly dreaded in phthisis; whatever else it may, or may not do, it certainly drains away the salts of the body, whose loss is injurious. Those who have watched carefully the progress of phthisis must be painfully aware of the exhaustion which profuse night-sweats occasion; and of the return of appetite which usually results almost immediately from their arrest. So long as they continue it is of little avail to give meat juice, milk, preparations of phosphorus, or other salts; for as fast as they are furnished to the system, they drain out in the pernicious night-sweats. Now, if these effects of opium upon parts which we do not wish to influence, and which are directly injurious, are not got rid of, the line of treatment to be adopted on first seeing a phthisical patient may and probably will do as much harm as good; possibly more harm ultimately. If, as has been recently suggested, the effects of opium upon the sudoriferous glands be antagonized by the co-administration of belladonna; and its action on the intestinal canal, met by giving it in a laxative vehicle as a little compound colocynth pill, then its good effects are largely secured, while its evil consequences are eliminated; and the minimum of evil and the maximum of good are attained.

The same holds good in bronchitis where there is much cough, due to the irritability of the dry swollen bronchial mucous membrane in the first stage of bronchitis. Here again the general practitioner is tempted to give paregoric, or its equivalent in some form, and immediate relief is given to the troublesome cough. But the treatment is neither rational nor is it successful; it is not the following out of the natural processes, but the traversing of them.

The stage of vascular turgescence precedes and is followed by that of free secretion; and the longer the first stage is kept up, the longer the case gives in without recovery. The opium checks secretion, and thus retards the oncome of the second stage; while it relieves the cough. A dose of opium at bedtime with a few grains of James's powder, so as to procure free perspiration, is admissible enough; and often attains the desired end of lowering the vascular tension and thus procuring a condition favourable to free secretion. But this desirable end is not always attained, and if opium be given in the day-medicine success is somewhat problematical. The day-medicine should contain ipecacuan with iodide of potassium, and the patient encouraged to inhale steam; and then the first stage will usually be effectually abbreviated. This treatment however is much more troublesome, and not nearly so striking in its immediate effects, as the plan of prescribing opiates. Where the irritative cough is very troublesome, some bromide of potassium will probably be found useful in allaying the reflex action-cough; while it is largely free from the drawbacks which attach to the exhibition of opium or morphia. There is too a difference betwixt the necessity for hypnotics at night in order to procure some of "nature's sweet restorer, sleep," and their employment as sedatives during the day; as day-cough, though annoying, is not so exhaustive as night-cough. In hospital practice night-opiates are necessitated still further in order that the owner of the cough may not disturb the other inmates of the ward.

In the same way must neuralgia be regarded. When it is severe the patient is anxious for immediate relief; and the practitioner probably gives a dose of morphia hypodermically, and almost instantaneous relief is so afforded. Or perhaps puts on a blister in facial neuralgia, and dusts the raw surface with morphia; or prescribes a liniment of aconite and belladonna and gives an opiate; or, if a very advanced practitioner, a dose of croton-chloral, or of gelseminum, and the patient is speedily more comfortable. There is not so much objection to such immediate treatment if the practitioner only recognize the causal relations of neuralgia; and bear in mind Romberg's famous dictum about neuralgia: "Pain is the prayer of a nerve for healthy blood," that is blood healthy in quantity as well as

quality. But if the first treatment is successful in affording relief it is very apt to be continued; and so the patient's real condition is that of growing worse instead of better. It may be essential to the acquisition of the patient's confidence to provide immediate relief; but having so acquired it, the practitioner should proceed to the measures which are required in the patient's real interest, viz., the removal of all drains upon the system, the curtailment of effort, and the exhibition of tonics and hæmatics. The two commonest forms of neuralgia in women, viz., intercostal and facial, are both usually accompanied by leucorrhœa with menorrhagia, or the act of suckling; and it is only by attention to these drains, that such neuralgia can be effectively treated. Strychnia, quinine, phosphorus, arsenic, and chalybeates may afford relief of a more or less permanent character; but the removal of the drain, or the improvement of the digestive organs if the anæmia be due to digestive assimilation, is as essential to cure; as is their specific remedy in the neuralgia due to malaria, to syphilis, to gout, or to lead poisoning.

Then, again, take the hypodermic injection treatment for sciatica. I have only tried it once. It gave immediate relief; but in the long end that was the most unsatisfactory case of sciatica I ever treated: and this was due to the treatment I feel sure.

Then, again, let us review the associations of dyspepsia. In the first place it is much more common in women than in men, and this fact at once supplies material for reflection. True primary dyspepsia, with a foul or raw tongue, is not more frequent in women than in men; and is in each sex equally amenable to its appropriate treatment. With the foul tongue a laxative pill at night and an effervescent saline aperient in the morning, with a mixture of nitro-hydrochloric acid and strychnia three times a day, is usually sufficient for the relief of the patient. When the tongue is bare and denuded of epithelium then alkalies with bismuth are indicated. In each case careful attention to the dietary is essential. But where the dyspepsia is found with a clean tongue, as it very commonly is in women, then this treatment, though it may give relief in many cases, is futile as to cure. Here the dyspepsia, often accompanied by

nausea and less frequently by actual vomiting, is reflex and set up by some far-away irritation; mostly pelvic, and very often uterine, but more commonly ovarian. Local treatment, with the exhibition of sulphate of magnesia till the bowels are well open; and bromide of potassium to deaden the nerve tracts along which the irritating currents pass from the ovary to the stomach, will soon bring a malady, otherwise treated very intractable, under control: and permanent relief be afforded. Yet some bismuth and hydrocyanic acid with an alkali may be the readiest means of relieving the patient, and meet with the approval of her friends.

How often too is a state of biliousness or even lithiasis most quickly relieved by a dose of calomel, or a mercurial pill, followed by a black draught and a seidlitz powder in the morning. The patient, satisfied with this method of obtaining relief, goes away and commits acts of error and indiscretion in diet; because relief can readily be obtained. Yet surely it will be admitted that it would be far better in the permanent interests of the patient to regulate the dietary; cutting down the albuminoids, substituting a dietary of fruit and farinaceous food for the meat, too frequently stated to be the only food the patient can take. By such means the work of the liver would be greatly economized, not only as to the storing up of glycogen, but, what is more important, the work of the oxidation of albuminoids would be lessened; and so the attacks would not be induced, or to a very much less extent. An occasional mercurial, given, as the late Dr. Murchison advised, for the furtherance of the oxidising processes in the liver, at night, and a saline aperient in the day till the bowels are freely open, twice in the morning and once at bed-time, will, in a few weeks, bring many a long-suffering bilious being to a state of health; or a near approach thereto. This last line of treatment will do permanent good; the first encourages the patient along a road that must terminate sooner or later in organic changes in the liver or kidneys.

Then, again, as to gout—true articular gout. When an acute attack is established, it is usual to give a blue pill at night to be followed by a seidlitz powder next morning, and to keep open the bowels by a mixture of sulphate of magnesia, carbonate of magnesia, to meet the gastro-intestinal acidity, and

colchicum. Now, whatever the action of the last remedy may be—and it seems probable that ultimately it will be found that its action is to arrest the oxidising process, the acute gout; and so to prevent a useful, if painful, process—it certainly quickly gives relief. Yet from the days of Paulus Ægineta to those of the late Dr. Todd, there have been those who hold that the exhibition of colchicum, while it gives speedy and swift relief in an acute attack of gout, nevertheless causes the gouty attack to become more frequent and to assume a more chronic form. Garrod says of Laville's Tincture, which, as is well known, is a very powerful preparation of colchicum, and often gives great and almost magical relief when everything else has failed:—"So far all appears favourable; but through a long experience I have found that patients almost invariably give up its use after a few years, and some who were most enthusiastic in its praise have become the greatest advocates for its disuse, and have often abhorred its very name." Really the dietary ought to be regulated, with the steady use of potash and lithia well diluted, so as to do away with the necessity for attacks of acute gout, which, like thunderstorms that clear the air, cleanse the system and oxidise out the deposits of urate of soda in the joints. Colchicum has been the curse of many gouty persons, and should only be resorted to under pressing circumstances. So, too, local treatment which gives immediate relief is fraught with danger in articular gouty inflammation. Garrod says of leeches—"Although leeches may occasionally give temporary ease, the recovery is thereby prolonged and permanent weakness of the joint induced." As to the application of cold, any one who has suffered from articular gout knows well the immediate relief produced; but the same authority says, "This plan of treatment is fraught with the greatest danger, as it is apt to cause retrocession of the articular inflammation, and the sudden and serious affection of some internal organ." As the application of leeches is frequently followed by ankylosis of the joint, so, too, the application of cold is injurious. A Count of Brittany, in the olden times, suffered severely from gout, which crippled him, so he procured some sacred vessels in which to lave his feet. He never after was able to use his feet. And the same occurred to a Lombard chief. Of

course at that time these results were attributed to divine wrath at the prostitution of the holy vessels ; really they were due to the local application of cold ; which, while it gives immediate relief, is followed by most grave and unfortunate consequences.

Again, let us look at the treatment of diarrhœa. How commonly is an astringent mixture, containing an opiate, prescribed without further reflection ? Of course in a great many cases immediate effects are produced which are gratifying to the patient. Yet in a certain percentage of cases such a plan is not only not successful, but does harm. In those cases where there is an offending mass in the intestines setting up a secretion to sweep it away—but where the secretion is set up too low for its removal—there is a teasing diarrhœa, a persistent desire to go to stool, with small, ineffective motions affording no relief. Here the ordinary diarrhœa mixture only does harm ; and what effect it has is to arrest a spontaneous reflex act often of a beneficial character. The proper treatment is to administer a dose of castor oil, or, better still, a scruple of rhubarb in powder, by which secretion is set up above the offending mass, and it is swept away ; after which the diarrhœa ceases. The secondary action of rhubarb in constipating the bowels renders it the agent *par excellence* for the treatment of this form of diarrhœa. The astringent and opium treatment of diarrhœa is equally, or still more out of place in those cases where there is a fecal mass lodged or accumulated in the rectum. Every surgeon who sees much of diseases of the rectum has instructive stories to tell of cases where the patient has consulted a large number of eminent physicians, without avail, for a persisting diarrhœa. The usual mixtures in great variety are prescribed without effect. At last the persisting tenesmus drives the patient to a rectal surgeon ; who, on examination, finds a solid mass in the bowel, around and past the sides of which the thin fecal motion passes. Here diarrhœa is the only possible means by which the bowels can be emptied ; and it is fortunate that the astringent mixtures are inoperative to arrest this diarrhœa, else the patient's condition would indeed be a serious one. The mass is removed, and then the diarrhœa spontaneously ceases.

Then, again, take the common resort to stimulants in fever.

That they may be indicated at times of acute peril from collapse we may grant ; they may enable the convalescing patient to eat more food ; but given, as they commonly enough are, during the fever, they are injurious. They make the patient feel a little better for the time by calling out a little of his reserve force ; but what good, in the name of reason, does that do ? It only dissipates, squanders in useless displays, what should be economised with the utmost diligence for the critical time when it is required ; and when it is invaluable. If the reserves be called out and wasted early on in a battle they are not there at the critical moment—and the battle is not won, but lost. So it is in fevers and some other acute diseases. Milk, and not alcohol or beef-tea, should be the food at these times. Who that has attended much midwifery among the more ignorant classes will fail to recognise the truth of what I am just about to say ? A primipara is in labour, and all is well ; but the advance is not rapid. Every time the doctor turns his back, he returns to find the patient with strong pains and bearing down energetically ; yet the os is only the size of a half-crown piece. Some foolish but well-meaning person has been giving that patient alcohol, and encouraging her to put forth useless efforts. Unless the medical man can stay by the case, and watch this meddling person like a cat watches a mouse, the case will have to be terminated by the forceps ; because the woman is spent and her power of effort gone, wasted in useless bearing down. Of old, commonly enough, the patient got a pretty stiff opiate, which sent her to sleep for twenty-four hours, when the labour—for labour then it was and no mistake—recommenced. But that twenty-four hours of the head pressing upon the tissues, and especially the urethra, will cause the patient to run great risk of a vesico-vaginal fistula, or a slough in the posterior vaginal wall, with its disagreeable consequences. In midwifery and in acute diseases the reserves should never be called out till the time for them comes ; when they have been thrown away they are not forthcoming, and the result is disaster.

Then, again, it is not always well to hasten convalescence, especially when the kidneys are implicated. Their function must be remembered. I will give an illustrative case which occurred to me a dozen years ago ; but its lesson is as fresh as

it was a month after the disaster. A girl was doing well, after acute nephritis, on milk and a restricted dietary; going on steadily, but slowly. The friends desired a consultation: thought something more might be done. Meat was added to the dietary; iron to the potash and buchu. We overran the powers of the kidneys; and the girl died of uræmia, in spite of everything that could be done.

But of all abnormal conditions when the immediate treatment of disease is to be utterly subordinated to the permanent interests of the patient, that of endocarditis stands out most prominently. Here there is acute inflammation of the endocardium which lights up a growth of connective tissue in the fibrous structures of the valves; most commonly the mitral and less frequently the aortic. It is not the acute inflammation here which causes any alarm, it is the growth of connective tissue which we dread. Such connective tissue has a natural tendency to contract after a time, and consequently the growth in the cardiac valves sooner or later mutilates and distorts these valve curtains until they either become insufficient to close the mitral ostium on the ventricular systole; or the free edges become fused together, and constitute an obstruction to the flow of the blood through the mitral orifice. It is obvious that the rational treatment of this condition is to limit, so far as is possible, the growth of this connective tissue; for once developed it cannot be absorbed, though in certain works even of recent date, ioduretted frictions are recommended; and will eventually contract and cripple the valve curtains. How is this to be done, is the question. I have insisted, in the recent edition of my work on *The Heart and its Diseases*, that the rational line of treatment is to be guided by what pathological observation teaches us as to the first stage; and the acknowledged principle of giving parts which are the seat of morbid changes, physiological rest. Consequently the patient should be kept quiet in bed; not only till all acute symptoms have passed away, but for some days longer.

It is impossible to give the mitral valve-curtains complete rest; but comparative rest may be afforded to them. Every time the ventricle contracts the mitral valve-curtains have to bear a strain equal to the distension of the elastic arterial system; the higher the blood-pressure in the arteries, then, the

greater the strain on the mitral valve-curtains; the lower the blood-pressure in the arteries, the less strain on the mitral valve. Consequently the patient should be kept perfectly quiet in bed; and have the blood-pressure kept low by repeated doses of chloral hydrate, for some days after the evidences of acute endocarditis have passed away; so as to keep the inflamed valve-curtains as quiet as possible, and to reduce the strain on them in each ventricular systole. By such means rest, that is, comparative rest, is furnished to the inflamed valves; and thus the growth of connective tissue is limited. The subsequent contraction is in proportion to the amount of growth; and the more the growth is limited, the less will be the ultimate mutilation. This is too clearly apparent for any cavil as to how it can be demonstrated in each case that the injury has been limited by such plan of treatment. It may not be possible to demonstrate in every case the good so achieved; but the adoption of this plan will be apparent enough in a series of cases. To limit the mischief at the outset is the essential treatment of acute valvulitis. If the growth of connective tissue can be limited, the distortion which results may be so small that the valves are still functionally competent to close the ostium on the ventricular systole. In such case the individual is little, if at all, injured; and has got off practically unscathed. But how different is this plan to that advocated in text-books. „Each plan of treatment, whether alkalies, blisters, or salicylates,“ it matters not, founds its claims to the confidence of the profession on the number of days which elapse before the patient is up and about. Yet to let the patient get up and walk about is to throw more stress on the mitral valve-curtains. But the mischief does not stop at this point; it is further advised to give digitalis, whose action, it is now well known, raises the blood-pressure in the arteries. By such a plan the pressure on the mitral valve-curtains is increased, and the growth of connective tissue encouraged; and with that the prospect of further distortion of the valves. Surely this is plain and uncontroversial? By lowering the pressure on the valves for some days after all active symptoms have disappeared, until, indeed, such time as the active proliferation of connective tissues shall, in all probability, have ceased, the primitive mischief is limited.

The valve-distortion which results has no tendency, unless it be in persons with very irritable tissues, to progress, but remains static; and if the injury is slight, muscular compensation is readily developed, and the patient's prospects of life are good. But if the valve-mutilation be great, then the compensatory changes are imperfect, and the case goes downwards; without necessarily any advance being made in the valve lesion itself. Indeed it is in endocarditis of all diseases that we can see clearly how at times the immediate treatment of a case may have to be subordinated to the permanent interests of the patient.

## Reviews.

*Stricture of the Male Urethra; its Radical Cure.* By FESSENDEN N. OTIS, M.D., Professor of General Urinary Diseases in the College of Physicians and Surgeons, New York. London: 1878.

THIS book affords a complete account of the views of Dr. Otis upon the size of the male urethra, the relation of contractions of its calibre to gleet or chronic urethral discharge, and other points, all sufficiently well known in this country. Although his practice has been tried by, and the author has himself demonstrated some of his opinions and practice to, English surgeons, they have not been cordially adopted in this country, where we still are of opinion that most, if not all, cases of gleet can be cured without internal urethrotomy, and that organic stricture is *not curable*. That Dr. Otis has done good service by drawing attention more pointedly to the connection between gleet and stricture is undoubted; but his reasoning from his own statements and facts is often so little capable of being sustained that we should like to attack him upon more than one point were we not sure that by so doing we should only afford him an opportunity of adding, in his second edition, another chapter to a book already sufficiently long.

*Pott's Disease: its Pathology and Mechanical Treatment, with Remarks on Rotary-Lateral Curvature.* By NEWTON M. SHAFFER, M.D., Surgeon in Charge of the New York Orthopædic Dispensary, &c. New York: 1879.

WE can recommend this short essay to those persons who desire to know the objections which may be urged against the "plaster-jacket treatment" of Pott's disease. The chief objections are two: that the extension practised in applying the plaster jacket is injurious; that the jacket can only be used in cases of disease of the lumbar and lower dorsal spine, the jury-mast being as inefficient as it is clumsy. The author's

first objection may be met by the fact that he himself employs the extension produced by two assistants, one at the axilla, the other at the thighs, an extension difficult to estimate and to control. The second objection is more important, for there can be no doubt that the treatment by Sayre's apparatus is less efficient when the disease is higher up in the spine. But the antero-posterior apparatus recommended by the author appears to us to be less simple, more difficult to apply, more expensive, and probably useless, unless it be well-applied. We quite agree with Dr. Shaffer in the opinion that all cases of Pott's Disease are not amenable to the same method of treatment.

*Lectures on Bright's Disease of the Kidneys.* By PROFESSOR CHARCOT. Translated by Henry B. Millard, M.D. London: Ballière, Tindall and Cox, 1879. pp. 94.

PROFESSOR CHARCOT delivered the above Lectures because he holds that "the vague and general views frequently entertained by practitioners concerning the forms and pathology of Bright's disease in many cases militate against their successful management of it." After giving an able *résumé* of the anatomy and physiology of the kidney, he proceeds to consider the different forms of kidney disease. He commences with the contracted form due to interstitial nephritis. This is otherwise known as the "cirrhotic," or "granular," or "gouty" kidney. The description is comprehensive, and will be found very instructive by those who have not given special attention to diseases of the kidney. Like other writers, Professor Charcot states that in this form of kidney disease albuminuria is often wanting, indeed, he says, "in the majority of cases at the commencement of the disease it occurs only temporarily." He then proceeds to describe the large white kidney with its consequential and associated conditions; after which he describes the scarlatinal nephritis, and concludes with the amyloid kidney. He says nothing of the fatty kidney. The descriptions of the different forms of renal disease are lucid and vigorous, and will be read with advantage by most students and practitioners. Unfortunately there is nothing said about treatment in this otherwise excellent little memoir.

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*Erratum.*—In page 274 of THE PRACTITIONER for last month, line 1, for "Hill," read "Will."

## Clinic of the Month.

### The Physiological Effects of Artificial Ischæmia.—

The effects on the functions of the part, produced by the application of Esmarch's bandages to the upper limb have been investigated by S. Fubini, who has published the results of his researches in Moleschott's *Untersuchungen zur Naturlehre*, Bd. xii. He has arrived at the following conclusions, derived from observations made on a strong man, aged 20: (1) When the hand and frame are brought into a state of bloodlessness by the application of Esmarch's bandages, the limb undergoes a diminution of volume, which is the subject of the experiment, amounted to 62 cc. of water, at the temperature of 86°–95° F. (2) The ischæmia may last from 30 to 35 minutes, and exceptionally as long as 45 minutes. (3) The average loss of heat in the ischæmic part (hand and forearm) may be estimated at about 7° F. (4) With the duration of the ischæmia the temperature of the limb continues to fall; so that at the end of 25 minutes the reduction may be as much as 12·5° F. On the other hand, there is a rise of about 2°–3·5° in the corresponding limb of the opposite side. After the cessation of the ischæmia there is a fall of about 5·5°–7° F. in the temperature of the embandaged arm, while the temperature of the limb that has been rendered ischæmic increases, and in about 50 minutes regains its original height. (5) The ischæmic limb rapidly loses its tactile sensibility and its sensibility to pain. The power of perceiving differences of temperature disappears more slowly; indeed the ischæmia cannot be continued long enough to produce complete insensibility to thermal stimuli. (6) Tactile anæsthesia and analgesia appear more quickly in the peripheral than in the central parts of the ischæmic limbs. (7) The muscular power, when tested by Regnier's dynamometer, after the ischæmia had lasted 20 minutes, was found to be reduced to nearly one-half of its original value. During ischæmia the hand and forearm excrete less carbonic acid than under normal conditions, the proportion being 100 to 148. (*The British Med. Journ.*, Oct. 4, 1879.)

**Hypophosphites in Phthisis.**—Dr. Sinclair Coghill, after a prolonged trial of the hypophosphites in cases of phthisis, has been led to believe greatly in their efficacy. The drugs were usually administered according to the following formula, which was found to suit the greater number of patients very well. Eight grains each of the hypophosphite of soda and hypophosphite of lime, in an ounce of infusion of cascarrilla, to be taken twice a day after meals. When anæmia was present to an extent to indicate specific treatment, the hypophosphite of iron in syrup was given either by itself or coincidently with smaller doses of the other two salts. The experience of Dr. Coghill, however, in regard to the iron salt has been most unfavourable. It seems to be extremely difficult of assimilation, and shows a great tendency to induce febrile movement, with especially rapid elevation of the temperature. The hypophosphites have valuable tonic properties, promoting the appetite, the digestion, and the assimilation more especially of fatty food. They have strong pyrogenic or heat-producing properties, acting on the system like phosphorus itself. These properties contraindicate their employment in advancing stages of phthisis, where there is high temperature and increased frequency of pulse. But when the disease is arrested they come into favourable consideration as a means of stimulating the nervous system, and through it the subordinate processes of nutrition. The feeling of languor and lassitude so often complained of by the consumptive seems to be greatly relieved. The salts, further, appear to possess valuable weight-making properties. (*The Lancet*, August and September, 1879.)

**Mydriatics and Myotics.**—Dr. Macnaughton Jones sums up his experience in regard to eserin, gelsemin, duboisin, and pilocarpin, in a paper read before the British Medical Association at Cork. The author finds that eserin is useful in various forms of corneal ulcer, especially marginal, with suppurative tendency; in cases of ulceration with perforation and prolapse; in incipient ulceration of the cornea; in traumatic inflammation of the cornea and suppuration of the corneal wound after cataract extraction; in mydriatic states, diplopia, asthenopia, and aberrations of accommodation; in glaucomatous states. The hydrobromate of eserin has also been employed with the most favourable results. Gelsemin has been used in the form of a neutral solution (four grains to the ounce) for diagnostic purposes. Duboisin has been found to be useful in keratitis, corneal ulcer, and inflammatory and painful states. It has been successfully used where atropin has had to be relinquished from the conjunctival irritation which it has caused. In all respects the action of the duboisin appears to be similar to that of atropin, though its effects are more energetic and last a little longer. Pilocarpin has not been

much used; its effect is less marked than atropin. Dr. Jones quotes the following indications and contraindications for atropin and eserin. *The Indications for the use of atropin are*—1. Narcotic, (a) pain where the ends of the subcutaneous trigeminal are implicated; (b) reflex spasms (photophobia). 2. Mydriatic, (a) diagnostic mydriasis; (b) therapeutic mydriasis. 3. Accommodation or adjustment, (a) diagnostic reagents for determining refractive anomalies; (b) therapeutic in treatment of progressive myopia in children where the adjustment spasm is present. *Contraindications for atropin are*—1. Absolute glaucomatous diseases where intra-ocular disease is present. It must be carefully used in pannus. 2. Relative, (a) individual idiosyncrasy; (b) maximal conjunctival injection and pannus; (c) cyclitic process with softness of the bulb and pupillar closing and shutting up; (d) caution is necessary with children, possible intoxication. Indications for Calabar bean. 1. Myotic, (a) in the natural and artificial mydriasis after the action of atropin for removing it before iridectomy for glaucoma; (b) for narrowing in case of peripheral choroid abscess, and in iris accidents. 2. Accommodation or dynamo-supplementing. In cases of impaired adjustment, especially in diphtheritis faucium. 3. Diminishing intra-ocular pressure. (*The British Med. Journ.*, September 6, 1879.)

**Tests for Rhubarb and Santonin in the Urine.**—In urine containing rhubarb, ammonia produces at once the same rose coloration developed by the addition of caustic potash or soda; the coloration, however, not being so intense, as with the latter substance. In urine containing santonin, this rose colour does not appear until the expiration of at least half an hour or an hour. With the carbonates of potash and soda, urine containing rhubarb gives promptly a roseate coloration, whilst with santonin this reaction shows itself only after a lapse of fifteen or thirty minutes. Spectrum analysis gives characteristic results. Santonin in moderately concentrated solutions, after treatment with potash, absorbs all the rays of the spectrum except the red and the yellow; in very dilute solutions the red and the blue rays pass through, the rest being absorbed. (*Gaz. Hebdom.*, May 16, 1879. *The Glasgow Med. Journ.*, July, 1879.)

**The Inhalation of Eucalyptus Oil in Diphtheria of the Pharynx.**—The number of remedies, local and internal, which have been proposed in diphtheria, is so large, and their efficacy in the hour of trial generally so trifling, that an apology is almost needed for bringing forward a new one. In the present instance our apology is the eminence of its supporter—Professor Mosler, of Greifswald (*Berl. klin. Wochenschrift*, No. 21, 1879), who strongly advocates the use of protracted inhala-

tions of the oil distilled from the leaves of *Eucalyptus amygdalina* and *globulus* to arrest the local mischief in diphtheria of the pharynx. He asserts that all the cases in this category which he has so treated have recovered, though admitting that there are "fulminating" cases of diphtheria in certain epidemics which resist all treatment. The oil is used diluted with rectified spirit, generally in equal parts; ten to sixty drops being used at each inhalation. The strongest solution which had been used at the time Professor Mosler wrote was the following:—R. Olei eucalypti 5·0, spiritus vini rect. 25·0, aq. dist. 170·0 grams. S.—for ten inhalations. The mixture must be well shaken before measuring. No bad effects whatever have followed the use of so strong a solution in the cases where it has been tried; but as a precautionary measure Mosler recommends it to be alternated with inhalations of a weaker one, where the inhalations have to be repeated at very frequent intervals, such as every hour. Eucalyptus oil does not produce headache like carbolic acid and turpentine, and its odour is very agreeable. The oil distilled from the leaves has the disadvantage of being very expensive—much more so indeed than the ordinary commercial oil obtained from the wood. The wholesale price is about sixty shillings a kilogram. Professor Mosler, however, considers the *oleum e foliis* the best to use for clinical purposes. (*The Medical Times and Gazette*, Aug. 23, 1879.)

**Pilocarpin in Intermittent Fever.**—Dr. Griswold reports six cases of intermittent fever in which he has tried pilocarpin. The conclusions at which he has arrived are the following:—The muriate of pilocarpin administered hypodermically will promptly cut short the chill of malarial intermittent fever. In a large proportion of the cases treated in this way the paroxysm aborts, terminating in the sweat caused by the pilocarpin, there being no hot stage. Such abortion of a paroxysm is in itself sufficient to effect a cure in many cases, whilst it is at all times a valuable adjuvant to treatment with quinine during the intervals. A dose of pilocarpin sufficient to produce these effects acts gently, without causing exhausting diaphoresis or unpleasant pyalism. Such a dose was found to be gr.  $\frac{1}{2}$ . The promptness with which an adequate dose of pilocarpin interrupts a chill suggests that it may possibly be of use in cases of pernicious intermittent fever, where the prevention of the full development of a paroxysm is often of the utmost importance. (*The New York Medical Record*, Aug. 16, 1879.)

**Propylamin.**—M. Alvarenga pleads in favour of propylamin as a remedy in certain rheumatic and thoracic affections. The work is based upon thirty-two cases observed in the hospital

of St. Joseph, in Lisbon, of each of which a detailed account is given, accompanied with statistics of the pulse, temperature, and respiration. M. Alvarenga has employed numerous preparations—propylamin, trimethylamin, and the hydrochlorates of propylamin and trimethylamin. The first pages of his work are devoted to the chemical study of the propylaminic compounds, and to the nomenclature of the vegetable and animal products which contain the remedy, and are thus of therapeutic value. M. Alvarenga considers that propylamin is a cardiovascular sedative, possessing the power of limiting nutrition and of slightly lowering the temperature, whilst it promotes expectoration. Propylamin is useful in acute attacks of rheumatism; it is a remedial agent in febrile states of the disease; but it is not superior to other drugs which have been employed. It may also be given in acute pulmonary diseases, and more particularly is it of use in pneumonia and acute pleuro-pneumonia. In several cases this method of treatment was exclusively adopted, and it appears to have afforded favourable results. The propylamin was given at the outset of the disease in 1·5—2 gram doses. (*Treatise* 1879, *Bordeaux and Paris*; Review in *Le Progrès médical*, Aug. 9, 1879.)

**The Treatment of Cardiac Dyspnoea.**—Prof. Sée says that in all cases of continuous cardiac dyspnoea he has found iodide of potassium answer very well, especially where the dyspnoæic symptoms were combined with a lesion of the tissue of the heart. It is equally useful in valvular lesions. Even if the diagnostic error of mistaking a simple cardiac dyspnoea for true asthma should be committed, the use of iodide of potassium would not be followed by any evil results, as it is an exceedingly useful drug in asthma. The direct effect of iodine in such cases is the promotion or rather liquefaction of the bronchial secretion. This greatly facilitates respiration. The dose given by M. Sée is 1·25 grams a day; this is gradually increased to two or three grams, and is made as follows:—℞ Iodide of potassium 10 grams, Syr. cort. aurant. 200 grams: two to four tablespoonfuls a day. Each spoonful must be dissolved in a tumbler of water. Patients suffering from heart-disease take iodide of potassium very well—better in fact than other patients. The following are the drawbacks of this drug: 1. Bleeding from the buccal mucous membrane, or bronchitis and hæmoptysis in tuberculous patients. Phthisis is therefore a counter-indication for the use of iodide of potassium. 2. Loss of flesh. In fat individuals this is to be regarded as a favourable symptom. 3. Loss of strength. In such cases the treatment must be at once suspended. 4. Loss of appetite. Opium may be added to iodine, in order to prevent the evil effects of iodism. ℞ Iodide

of potassium 10 grams, Syr. cort. aurant. 200 grams. Extract: thebaic. 0.10 to 0.15 gram. From four to two teaspoonfuls a day. For the extract theb., the syr. diac. may be substituted (50 grams). Opium is given here with the view of making the iodine more easily tolerated, and of diminishing the cough, which greatly inconveniences the patient. Another very useful combination is that of digitalis with iodine, as the one has a soothing influence on the dyspnoea by acting on the lungs, and the other increases the action of the heart and modifies the arterial tension. The following formula will be found to answer well: R. Julep. gomm. 100 grams, Potass. iod. 2 grams, Tinct. digit. 40 grams; or the following formula: Extr. gent. 0.10 gram, Pulv. fol. digit. 0.15 gram. To take one pill three times daily, together with the solution of iodine, which we have mentioned above. In cases where patients cannot take digitalis, chloral will be found to be a good substitute. Thus: *e.g.* Julep. gomm. 120 grams, potass. iod. 2 grams, chloral hydrate 4 grams. To be taken every two hours during the day. (*Concours méd.*, July 12, 1879; *The London Medical Record*, Aug. 15, 1879.)

**Treatment of Cholera by Hypodermic Injection of Morphia.**—Dr. Batukram Mehta reports the following case:—A lady, aged 22, a caste Hindoo, was found suffering from all the symptoms of a severe attack of cholera. The usual medicines were tried without effect, whilst the symptoms increased in severity. Diarrhoea and vomiting became incessant, the pulse was fluttering and almost imperceptible at the wrist, with severe cramps and coldness of the extremities, violent and unbearable pains felt in the abdomen, loss of voice and partial coma. There was a total incapability of retaining even a small quantity of food or medicine in the stomach. The hypodermic injection of a quarter of a grain of hydrochlorate of morphia in the right hypochondriac region was adopted as a last resource. The effect was marvellous: the diarrhoea and vomiting ceased at once, the pains disappeared, the pulse was re-established, and the patient rapidly recovered. In two other similar cases of cholera the same plan of treatment has been adopted with the best results. As a rule in all cases of cholera pills composed of black pepper, camphor, and assafoetida with the addition of opium have been found to be serviceable in the early stage of the disease. (*The Lancet*, Aug. 23, 1879.)

**The Use of the Cold Bath in Enteric Fever.**—Dr. Alex. Collie has given personally 100 baths, some in severe, others in moderately severe cases of enteric fever. The general effect of this mode of treatment appeared to be immediate lowering of the temperature, taken per rectum, two or three degrees. For

about three quarters of an hour after the bath this fall continued, but after the expiration of this time the maximum fall had been reached. It then began to rise, reaching its former height in periods varying from one to several hours. In a large number of cases sleep followed, varying from one half to two or three hours. The general conclusions as to the value of the bath were, that in the milder cases, and in some of the more severe ones also in the early period of the disease, the bath given once or twice daily was a useful way of relieving the discomfort produced by the heat; of allaying restlessness and of producing sleep; that beyond temporary relief of symptoms it had no effect on the course of the disease. Lastly, that in severe cases the remedy was inadmissible, owing to its depressing effect upon the body generally, and to the exhaustion which its administration entailed, but above all for its definite and marked effect upon the circulation, which it invariably greatly weakened. In administering the cold bath, therefore, it is advisable to look carefully to the state of the heart, and to take into account the restlessness and sleeplessness of the patient. In cases in which the pulse is much enfeebled, a stimulant should be administered whilst the patient is in the bath. (*The British Med. Journ.*, Sept. 20, 1879.)

**Treatment of Chorea by the Hypodermic Injection of Fowler's Solution.**—Dr. L. Péroud has employed hypodermic injections of arsenic in chorea since 1875. M. Henri Garin describes in his thesis (*Thèse de Lyon*, No. 14), results obtained in thirty-three cases of chorea in children at the Charité Hospital. In the method followed by M. Péroud four or five drops of pure Fowler's solution are injected into the cellular tissue by means of a Pravaz syringe. An injection is usually made every day, but sometimes it is only required every second or third day. The region preferred for injection is some place where there is loose cellular tissue and but few nerve filaments. It is sometimes preferable to inject at the level of the muscles most affected. The cases related occurred in females from the age of  $4\frac{1}{2}$  to  $14\frac{1}{2}$  years. Amongst them were recent, old, and relapsed cases; cases of rheumatic, paralytic, and cerebral chorea. M. Garin's reasons for preferring subcutaneous injections are as follows:—First, they do not give rise to gastric disturbances: secondly, the curative effect is generally more rapidly obtained: thirdly, only small doses administered every two or three days are necessary. Subcutaneous injections cause but little trouble in children; they give rise to no local irritation, although sometimes, when the organism has become saturated, slight indurations occur at the punctures. Intolerance of arsenic is occasionally met with, but this is rare, especially in

children, who take it very well. Under the influence of hypodermic arsenical medication rapid amelioration is the rule. As the chorea advances towards a cure the children become fat, the weight of the body progressively increases, and the amount of solid matters secreted by the kidney diminishes. Under the influence of arsenical injections sixteen cases of chorea ended in recovery after an average of thirty-two days' treatment, and about eighteen by hypodermic injections. In these sixteen cases the treatment was purely arsenical. Of thirteen other cases of chorea submitted to injections of arsenic, and also to various other remedies, ten recovered, but a longer time was necessary. These thirteen were moreover almost all old or relapsed cases. Hence it may be concluded that arsenic has more chances of effecting a cure in recent and simple cases than in old and inveterate ones: a statement which is contrary to the assertions of Aran and Ziemssen. (*The British Med. Journ.*, Sept. 27, 1879.)

**Hyposulphite of Soda as a Specific in Zymotic Disease.**—Mr. Crowther has made a successful use of hyposulphite of soda in a large number of cases of zymotic disease. He gives an account of three selected cases, one of abortion with hæmorrhage, followed by septicæmia: the patient was discharged cured in less than three weeks. The second one of scarlatina, followed by diphtheria: the treatment in this case was a saline mixture with nitric ether and hyposulphite of soda eight grains, every eight hours, with strong slops, wine, and eggs. When the diphtheria set in, the throat was constantly gargled with a lotion of chlorate of potash, dilute hydrochloric acid, glycerin, and tannic acid, with the inhalation of sulphurous acid from Siegel's spray; also extra wine and eggs were given, followed by a tonic mixture of iron, nux vomica, and quassia, as the patient was convalescing. The third case was one of compound comminuted fracture in the elbow-joint, with erysipelas. In each of these affections the symptoms, both local and constitutional, receded with unusual rapidity. The hyposulphite of soda appears at once to enter the blood, rapidly influencing for good the zymotic change. (*The Lancet*, October 11, 1879.)

## Extracts from British and Foreign Journals.

**Hypodermic Medication.**—The *National Medical Review* gives the following list as embodying the principal conditions in which hypodermics have been employed:—*Ununited Fractures.* Glacial acetic acid, five to ten minims, between ends of the bones with hypodermic syringe. Iodine has also succeeded, used in same way.—*Surgical Shock.* Quinine, six grains, hypodermically, with one-third grain of morphia.—*Urticaria.* Saturated solution of bisulphite of soda, injected directly into the part affected.—*Hæmoptysis.* Sclerotic acid, substitute for ergotine, five-per-cent. solution injected in the neck or arm.—*Tumours.* Just before removal, hypodermic of half grain of morphia, with a thirty-sixth grain of atropia, directly into the growth.—*Chloroform-poisoning.* One-tenth grain of digitaline, hypodermically, followed an hour afterward with one-tenth grain of atropia in similar manner, has been successful.—*Erysipelas.* Carbolic acid, three-per-cent solution, eight or ten injections at the same time, so as to surround and cover the inflamed regions; also salicylic acid in same manner.—*Carcinoma.* Acetic acid, one part to three of water, injected into the cancer has proved successful in shrivelling the tumour and obviating an operation.—*Cerebral Apoplexy* has been successfully treated by subcutaneous injections of ergotine in the arm.—*Hiccough.* In an obstinate case, resisting all other means, three-eighth grain of chlorohydrate of pilocarpin, hypodermically, quickly proved successful.—*Puerperal Convulsions.* Chloral subcutaneously has been pronounced better than when swallowed.—*Foreign Body in Esophagus.* Threatened strangulation from impaction of gullet has been promptly relieved by inducing vomiting. Apomorphia, one-tenth grain, hypodermically. Emetina is also suggested in same way.—*Strychnia-poisoning.* Caffein, one grain, hypodermic; alcohol in same way is also suggested; chloral injections are also mentioned.—*Puerperal Eclampsia.* Veratrum viride, two to four drops of the tincture, subcutaneously, as required to keep the pulse down to about sixty. Pilocarpin, two-per-cent. solution, is also recommended.—*Trichinosis.* Tincture of ergot and ergotine have

effected speedy cures, hypodermically, into muscles affected. —*Skin-diseases caused by Animalculæ*. Sulphuric, carbolic, salicylic, or sclerotinic acids, hypodermically, as in erysipelas. —*Nasal Polypus*. Carbolic acid, one part; glycerine, four parts; twenty drops injected into tumour by means of hypodermic syringe effectually dissipated polypus in case reported. —*Eczema*. Arseniate of soda, hypodermically, in solutions of one-fifth, one-half, and one per cent., commencing with ten minims of the weaker and gradually increasing is recommended. —*Nocturnal Enuresis*. Two very small doses of the nitrate of strychnia, injected in the vicinity of the rectum at suitable intervals, have proved successful. —*Croup*. Sulphate of atropia, one-per-cent solution, has proved successful in a desperate case, injected in the neck on level with pneumogastric. Three drops, repeated after four hours. —*Congestive Chills*. Ten drops of tinct. belladonna, hypodermically, every fifteen minutes, until the pulse became distinguishable, succeeded where the patient was unconscious and unable to swallow; followed by hypodermics of quinine, brandy, or whisky. —*Goitre* has been successfully treated by subcutaneous injections of ergotine, one-third, gradually increased to one grain. —*Membranous Croup*. Equal parts of water and sol. ferri perchlor. injected into the trachea, piercing the needle through just below the thyroid cartilage, dissolves the membrane, enables its expectoration, and substitutes tracheotomy. —*Erectile Tumours* have been successfully treated by injections of perchloride of iron and chloride of sodium in solution, the tumour to be surrounded by a ring. —*Abortion* has been caused by hypodermics of pilocarpin. This should insure caution. —*Hæmorrhages*. Hæmoptysis, hæmaturæsis, and uterine hæmorrhages have all been arrested by hypodermics of ergotine. If pain, add morphia. —*Night Sweats*. Atropine has given good results in injections of about one-fortieth of a grain at bedtime. —*Tetanus*. Chloral hydrate is recommended in conjunction with chloroformization, alternating it with other powerful anodynes and antispasmodics. —*Infantile Convulsions*. Morphia, subcutaneously, with inhalations of five drops of nitrite of amyl immediately following, have proved successful. —*Retention of Urine* from paralysis of the bladder, accompanying typhus, variola, and hydrocephalus, has been promptly overcome by hypodermics of ergot in the fossa behind the great trochanter. —*Arrest of Perspiration*. Pilocarpin, the alkaloid of jaborandi, will cause more or less profuse sweating, according to amount injected beneath the skin. —*Opium-poisoning*. Quite rapid recovery is reported to have followed warm hypodermics of fluid extract coffee in thirty-minim doses. Caffein, citrate and sulphate of atropia are also considered antidotes to opium. —*Suspension of Salivary Secretion*. Pilocarpin

used as heretofore explained excites salivation.—*Chorea*. Curare, in hypodermics of from one-tenth to one-twentieth of a grain daily, has been found valuable in this disease.—*Obstruction of the Bowels*. Aloin has been used with success, subcutaneously, to move the bowels.—*Hydrophobia*. Much amelioration of the symptoms has followed hypodermics of curare.—*Bubo* has been aborted by injecting carbolic acid into the centre of the swelling.—*Syphilis* has been treated by solutions of some of the mercurials, injected locally.—*Hernia* is more easily reduced by giving a hypodermic of morphine with or without atropia.—*Dysentery*. Morphia, hypodermically, in one-third-grain doses, has been found more rapid in relieving tenesmus than any other opiate.—*Epilepsy*. Curare, in solution, seven grains in twenty-five minims water, with two drops hydrochloric acid. About once a week inject about eight drops beneath the skin. It has cured cases of several years' standing within two months.—*Snake-bites*. Ammonia, brandy, carbolic or salicylic acids are all recommended, hypodermically, in case of snake-poison, and have been injected with benefit directly into a vein. (*The Canada Lancet*, Sept. 1879.)

**The Treatment of Chlorosis.**—The experiments which have been carried on by M. Hayem for several years, show that there is in chlorosis not only a diminution of the number of red corpuscles, but that there is in addition an individual change in the corpuscles themselves. This modification is owing to the fact that the red corpuscles possess an insufficient quantity of hæmoglobin. Iron acts by preventing this individual alteration in the corpuscle. To this statement it may be objected that compounds of iron are only of use to the organism indirectly, by stimulating the appetite. Chlorosis is generally accompanied by well-marked and obstinate anorexia. But it is understood that many of the preparations of iron stimulate the appetite, and it may therefore be asked whether chlorotic patients who take iron and recover their appetites are unable to assist in renewing not only the number but the quality of their red corpuscles. For the purpose of demonstrating this fact, M. Hayem, in conjunction with M. Regnault, has undertaken a series of experiments, in which insoluble preparations of iron, such as potassium ferrocyanide, which pass through the organism unchanged, were administered. The experimenters found that these preparations are absolutely incapable of assisting in the renewal of the blood. M. Hayem then adopted the plan of making his patients inhale oxygen. M. Demarquay first showed that this was one of the best methods for stimulating the appetite. M. Hayem caused his patients to inhale oxygen to the extent of ten litres a day at two or three sittings, and has thus obtained wonderful results in

regard to stimulation of the digestive functions. Chlorotic patients who could scarcely be induced to eat raw innutritious vegetables became perfectly ravenous after some days of this treatment, and ate five or six of the hospital rations in the course of 24 hours. The quantity of urea eliminated in the same time rose from 10—12 grams up to 35—40 grams per diem. The general health was improved, and the body weight increased, but the patients retained their characteristic colour, and still remained chlorotic. In fact, the examination of the blood showed that a marked increase in the number of blood corpuscles had occurred, but that the essential alteration, that is to say, the insufficiency of hæmoglobin still remained. The patients under these conditions, therefore, made a large number of corpuscles, which were no longer normal. After the expiration of two or three months of this treatment the scarcity of colouring matter in the red corpuscles as shown by the microscope contrasted markedly with the improvement in the digestive functions and in the general health, and it was only necessary to stop the inhalation of oxygen to see the patient return to his former wretched condition. To complete his experiments it only remained for M. Hayem to combine the inhalation of oxygen with the administration of soluble preparations of iron. The red corpuscles were then not slow to recover their physiological properties, the beneficial results being hastened by the fact that under the influence of oxygen the alimentary canal is rendered more tolerant of the iron. From these results it may be concluded: (1) that soluble preparations of iron are alone capable of modifying that change in the red corpuscles which is the essential character of chlorosis. (2) In chlorotic patients affected with dyspepsia inhalations of oxygen should be considered as a beneficial adjuvant to the treatment of iron. (*Le Concours Médical*, July 26, 1879.)

**Pyrogallic Acid.**—Jarich (*Wiener med. Blätter*, Nos. 15 & 16, 1878,) publishes the results of his experiments upon the action of pyrogallic acid in lupus. After the continued application of a ten-per-cent. salve for three days, the cell infiltration which forms the characteristic tubercles is destroyed, whereas the intermediate portions of healthy skin are scarcely acted upon. On the third day the application becomes very painful, and remains so for some time, even when the parts are dressed with a neutral salve like vaselin. Reaction in the surrounding tissues seldom occurs. Cicatrisation of cauterised parts takes place in from one to three weeks, but is always followed by the development of new lupus nodules, which renders necessary a frequent repetition of the application. The resulting cicatrices are distinguished by their smoothness, whiteness, and softness. It seems to be

effective in all forms of the disease. During three months of last year it was used exclusively in the clinic upon thirty-one cases, nineteen of which were discharged, either completely cured or greatly improved. In epithelial carcinoma its effects are somewhat doubtful, but Koposi (*Viertel. für Derm. und Syph.* vi. Jahrg. 1 Heft) speaks of its action here as remarkably favourable. (*The Boston Med. and Surg. Journ.*, June 12, 1879.)

**Notes on Pilocarpin.**—Dr. Spillman gives the following *résumé* of the history and therapeutic uses of pilocarpin. It is obtained from jaborandi, a powerful sudorific and sialagogue, to whose properties attention was called by Cortinho, and afterwards by Gubler, noticing the medicinal value of one of the Rutaceæ, *Pilocarpus pinnatus*. Pilocarpin is a syrupy, viscid liquid, soluble in water, alcohol, and chloroform, forming crystallisable salts with nitric, sulphuric, and hydrochloric acids. 100 kilos of the leaves of jaborandi yield about 70 grams of pilocarpin. Hydrochlorate of pilocarpin forms white transparent crystals which possess a somewhat bitter odour, and are soluble in water. Two centigrams of the salt appear to produce the same effects as five grams of the jaborandi leave in 120 grams of water. Pilocarpin given in minute doses causes an excessive secretion of saliva and tears, accompanied by profuse perspiration. Morphia and atropin when injected, unless a large quantity of the drug has been employed, rapidly allay all the symptoms produced by the pilocarpin. Instilled into the eye pilocarpin causes contraction of the pupil. It also appears to excite the secretion of the ceruminous glands, and the glands of the bronchial mucous membrane, whilst it has no effect upon the mammary glands; it increases however the peristaltic action of the intestines, and occasionally provokes a hypersecretion of the intestinal glands accompanied by a serous diarrhoea. Pilocarpin is generally administered by subcutaneous injection, in doses of 1-2 centigrams. R Hydrochlorate of pilocarpin, 0 gr. 20, distilled water 10 gr.; a Pravaz syringe of 1 cc. capacity will then contain 2 cg. of pilocarpin. This drug has been employed in a multitude of affections, as, for instance, typhoid fever, catarrhal angina, acute articular rheumatism, neuralgia, parotiditis, and cedematous diseases, as well as in dropsy. It has also been employed with success in an epidemic of scarlatina. It must be used with care in heart disease, however, as it exerts a marked action upon the circulation. When administered to patients suffering from diabetes the amount of urine is diminished, but the proportion of sugar eliminated remains the same. From a long trial Sæuger has come to the conclusion that it increases the strength of the pains in labour, but that it is unable to originate them. Pilocarpin is much used by oculists in diseases of the

iris; its action upon the iris seems to be similar to that of eserine, but it is less irritating. Dr. Schmitz of Cologne has observed that the hydrochlorate of pilocarpine possesses the peculiar property of causing a fresh growth of hair. (*Archives Générales de Médecine*, Sept. 1879.)

**Gelsemium in Hectic.**—Dr. Holden recommends the use of Gelsemium in the treatment of this symptom of consumption. He states that in a very large number of cases this drug has been of service. It is to be administered in doses of two drops of the fluid extract, or 10-12 of the tincture, every two hours; when administered in this quantity it will, in the majority of cases, arrest the chill, moderate the cough, and allay the fever within forty-eight hours. The period of administration is not, however, always so short. It may be used continuously, if necessary to maintain its sedative effects, without interfering with other medicines, or affecting the digestion or excretions. It should be added that exceptions are likely to occur in cases with mesenteric complications and colliquative diarrhoea, and whilst not contraindicated it may sometimes disappoint expectations. The *rationale* of the use of gelsemium in hectic is to be found in the fact that the affection is respiratory and is characterised by irritation, having its seat and origin in the pulmonary tissues, whilst it is upon these tissues, as well as the mucous tract in connection with them, that the drug exercises a sedative action. (*The New York Med. Record*, March 1, 1879.)

**Composition and Therapeutic Uses of true James's Powder.**—Dr. O'Connell has been unable to discover with certainty what is the true chemical composition of this preparation; he therefore simply states that it is antimonial. The various ingredients are, oxide of antimony, antimonious acid, calx of antimony, and phosphate of lime. James's powder is a diaphoretic, antiperiodic, and antipyretic. Its diaphoretic action is gentle and moderate. As an antiperiodic, in the intermittents of children it is quite as prompt and as effectual as quinine. As an antipyretic it causes a steady decrease in the temperature and pulse-rate as soon as its administration is commenced. It does not any more than quinine prevent an increase of temperature when a fresh focus of inflammation is lighted up, such as the implication of a fresh lobe of the lung during a case of pneumonia. It seems to exercise a specific effect on puerperal inflammations, arresting the morbid action, whether it be a metritis, cellulitis, or peritonitis, causing a very speedy and complete resolution of the inflammation, with return of the lochia. It also appears to exert a very marked beneficial action in pneumonitis. James's powder is superior to quinine in the fact that it does not produce tinnitus aurium or disturbance of

vision, whilst it is tasteless, and can be taken with or without sugar, by young or old, on the most delicate stomach. Such small doses as 20—30 cgm., to adults every two or three, four or six hours, as may be required, need not be exceeded, and will produce, but more slowly, the same depression of temperature as 1—2 grams of quinine once or twice a day. (*The Chicago Medical Journal and Examiner*, Aug. 1879.)

**Treatment of Nocturnal Incontinence.**—Dr. Kelp has effected cures in obstinate cases of this affection by the subcutaneous injection of nitrate of strychnia. The injection is made in the neighbourhood of the sacrum: a single administration of a small dose is found to be sufficient to arrest the complaint for a certain period. His last observation was made upon a young lady, aged 18, who had suffered every night for several months, after an attack of scarlet fever. In this case every precaution had been taken, such as abstinence from fluids in the evening, micturition during the night, &c., but in vain. The first injection of strychnia procured an intermission for several nights. The treatment was then repeated, and the cure was complete. The girl was strong and in good health; she had never suffered previously from incontinence. (*Arch. méd. Belges; Le Praticien*, Jan. 27, 1879.)

**Treatment of Pertussis by Inhalations of Carbolic Acid.**—The method as first tried during an epidemic of whooping cough in the Asylum for the Blind at Dresden, in 1877, consisted not only in administering weak carbolic acid inhalation from time to time, but in continually keeping the patients in apartments carbolised with a spray of 20 per cent. solution (otherwise well ventilated); the patients were sent out into the open air only for one hour daily during fair weather. This method was adopted because ten other children isolated from the rest were being treated on a different plan at the same time, and because single experiments with carbolic inhalations according to Bucharel's method had given no striking results. It is to be remarked that no signs of carbolic acid poisoning showed themselves in any of these patients; on the contrary, they enjoyed very good health. For the first three days of treatment scarcely any decrease in the number or intensity of the attacks could be established, then in any exceptional case improvement showed itself, and finally in cases which from the first had been severe. As a rule the convulsive stage could be declared ended at the expiration of the first week. In only a few cases which were not treated from the commencement, the convulsive stage extended into the second week. A slight bronchial catarrh still continued for several weeks. It is noteworthy that when the spray was omitted on the fourth day, all the patients had severe

and more frequent attacks, which moderated when the spray was again commenced. The author observes that this treatment has proved efficacious not only in children of ten or twelve years of age, but also in those of one year old, as evidence of which he has eighteen cases. In one case, two children, respectively one and two years of age, during sleep were left in an apartment free from carbolic acid vapour; but even then the duration of the very severe convulsive stage lasted only nine and ten days respectively. (*The New York Med. Journ.*, July 1879.)

**Malarial Cachexia.**—Dr. Webster understands by the term malarial cachexia that acquired modification of the human constitution which is the remote consequence of malarial poisoning. This modification appears to be permanent, becoming more deeply impressed upon the constitution with the lapse of time. In the treatment of persons suffering from malarial cachexia the end to be kept in view is the promotion of general nutrition and the palliation of morbid symptoms so far as practicable. Perhaps the most important symptom that presents itself to the attention is the sluggishness of the abdominal viscera, and to counteract this a seidlitz powder and blue pill, or an emetic, are the best means. In either case the remedy will have to be occasionally repeated, whilst the bowels are kept open by proper diet or other means, among the best of which is podophyllin in small doses at night, saline and alkaline laxatives as the Carlsbad salt, or the following nearly equivalent combination taken early in the morning: sodii sulph. 1 gr. 23, sodii tricarb. 0·60, to be taken in a cup of warm water. Tonics are manifestly called for by the symptoms, and the following pill has been found to be efficacious:—

R. Quininæ sulph. . . . .	0·12 gr.
Acid-arsenios. . . . .	0·002 „
Pulv. capsic. . . . .	0·06 „
Ext. tarax. . . . .	q.s.

To be taken before each meal.

The mineral acids after eating are of very great utility in these cases, nitric, muriatic, or their combination freely diluted. The anæmia may be treated with the following combination:—

R. Ferri et potass. tart. . . . .	0·30 gr.
Liq. potass. arsenit. . . . .	0·12 „
Potass. bicarb. . . . .	0·60 „
Tinct. nucis vomicæ. . . . .	1·30 „
Aquæ . . . . .	add 4

To be taken in a wineglassful of water before eating.

Iron is not well borne as a rule, but corrosive sublimate, a valuable tonic, may be given in doses of one to two milligrams

(one-sixtieth to one-thirtieth of a grain) in a bitter tincture, and it may be used with advantage alternately with the other tonics. In malarial cachexia, however, no form of medication appears to be beneficial for any length of time, but frequent changes are necessary—change of climate, a sea voyage, hot springs, are all worthy of a trial, and the matter of general regimen is of prime importance. (*The Boston Med. and Surg. Journ.*, Aug. 7, 1879.)

**Recent Observations on Mumps.**—Dr. Pinet, an army surgeon, has lately had ample opportunity of studying this disease closely in French barracks, where it seems to occur epidemically, and of tracing it to its origin. After giving an historical sketch of the labours of his predecessors on the subject, Dr. Pinet very carefully enumerates and analyses a number of cases, and draws from them the following conclusions:—(1) The affection must be considered general, not local, because in certain cases general symptoms have preceded the local ones, which manifested themselves in the form of affections of the parotids, testicles, prostate, urethra, intestines, eyes, brain, &c. (2) It has never been known to occur twice in the same individual. (3) It occurs epidemically. (4) It is contagious. As far as the etiology of the disease is concerned, the author ascribes it to miasmatic and contagious causes which affect the whole organism: but he does not exclude the possibility of infection caused by the medium of outward circumstances and surroundings, or individual predisposition. He traces back to these influences the first impression caused by zymotic germs on certain organisms, where they find a fertile soil that is ready to receive them, as well as to their predilection for certain organs. It is well known that inflammation of certain glands may either exist alone or follow in the rear of some other similar inflammation. The prevailing idea as to this affection is that though painful it is harmless; but the disease is known to have given rise to serious complications, among them atrophy of the testicles, which seems to occur much more frequently than has been suspected. It either affects only one testicle or it spreads to both, reducing them to the size of a nut or an almond. Another and not less serious complication is disease of the kidneys, which manifests itself as albuminuria, uræmia, and œdema of the skin and extremities, and generally appears when the swellings of the glands have begun to decrease. In some cases the patients have died of uræmia; in others, a milk diet, combined with the internal administration of perchloride of iron, has proved successful. Jaborandi, according to Dr. Testa, is a most powerful and efficient remedy. The efficiency may be explained by its hydragogue and diuretic properties.

given in time it may prevent the affection from breaking out. (*Journ. de Connaiss. med.* Jan. 1879; *The British Med. Journ.* Aug. 23, 1879.)

**Ataxy after Diphtheria.**—A typical case of diphtheritic paralysis, occurring in a youth of eighteen years of age, is reported by R. Schulz. There was paralysis of the soft palate, of accommodation, of the internal recti, and of the extremities. The sensibility of the skin and muscles—the muscular sense—was unimpaired, but the gait was feeble and unsteady, and there was marked ataxy of movement, more perceptible in the legs than in the arms. Pressure upon the large nerve-trunks of the extremities and upon the highest sympathetic ganglion was very painful. The tendon reflex was absent in both legs. Stimulation of nerves and muscles gave no special result. As the ataxy had no central origin, and as there was no sensory disturbance, the author believes that it must be considered as simply spinal and motor in origin. Schulz considers, with Rumpf, that ataxy and the absence of the tendon reflex are due to an affection of the grey substance of the spinal cord. In his special case, this was due to an ascending neuritis affecting the peripheral nerves until it reached the grey substance of the cord. As regards the relationship of the tendon reflex to ataxy, Schulz thinks that it is to be found either in processes taking place in the grey matter itself, or in exalted function, as for example in disturbance of the reflex inhibitory fibres of the lateral columns. If, therefore, the ataxy is accompanied by an increase in the tendon reflex, the lateral columns should be diseased; whilst if there be no sensory disturbance, but the tendon reflex be absent, the grey substance should be affected: finally, if ataxy exists both with sensory disturbance and absence of the tendon reflex, the lesion should be looked for in the posterior cords of the spinal column. (*Arch. f. klin. Med.* xliii. p. 360, and *Obl. f. med. Wiss.* Aug. 16, 1879.)

**Iodine in Dry Asthma.**—Dr. Lee Reed uses the following prescription in dry asthma—pulmonary spasm with suppression of the bronchial secretion:—Liquor iodin. comp. f. ʒi. Mell. ʒij. Ms. Teaspoonful every three hours. From this solution he has noticed the following effects. A gradual restoration of the bronchial secretion quite perceptible after the third dose. A diminution in the frequency and severity of the paroxysms from the beginning. An improvement in the appetite, and an increase in the tone and vigour of the general system. A perceptible increase in the quantity of the urine without any change in its specific gravity. Iodine has been more permanent in the beneficial effects than any other remedy which the author has used in these cases. The effects, however, appear to be so

modified by idiosyncrasy, that it does not always produce the same salutary effect. Iodine appears to act as an alterative expectorant, and by this means affords relief. (*St. Louis Clinical Record*, May 1879.)

**Employment of Chloroform in Heart Disease.**—M. Dieulafoy read a report to the Soc. Med. des Hospitaux, from Dr. Vergely, of Bordeaux, who has paid special attention to the action of chloroform in disease of the heart. There are at present two opinions in regard to the administration of this anæsthetic in such cases; of these the first, which is the more widely spread, absolutely prohibits the use of chloroform, even for the performance of an operation, when there is any suspicion of cardiac affection. The second opinion is the one held by M. Vergely, who quotes several cases to uphold it. He believes that, when administered with caution, chloroform is not only harmless, but may be of the greatest use in dyspnoic affections caused by cardio-aortic lesions. The first case recorded is that of a patient suffering from hypertrophy of the heart, aortitis, and angina pectoris, with alternating dyspnoea and angina pectoris. All the usual remedies were tried—opiates, digitalis, aconite, and even injections of morphia—but drastic purgatives alone seemed to afford the slightest relief. Inhalations of chloroform were very successful, when given a teaspoonful at a time, sprinkled on a handkerchief. In two months six kilograms of chloroform had been thus inhaled, giving an average of 100 grams a day. The second case was of a complicated mitral disease, the painful symptoms of which could only be relieved by the use of chloroform. In the third case there was a double aortic lesion. In brief, then, chloroform can be given without danger to patients suffering from heart disease, and in certain cases affords relief. (*Le Praticien*, Jan. 20, 1879.)

**Alcohol an Antidote for Strychnia.**—M. Hameau has investigated the effects of the subcutaneous injection of alcohol on rabbits in cases of poisoning with strychnia. A gram of alcohol injected beneath the skin of a rabbit, which was for a space of five minutes apparently dead, brought it to life within three minutes. The limbs relaxed, and convulsions could no longer be produced in it with the same facility by external stimuli. Half an hour later the recovery was complete, and the animal was feeding. The same quantity of alcohol administered to a normal rabbit produced coma and death in twenty-four hours. M. Hameau believes that alcohol acts beneficially in all conditions of excitement of the nervous system, and that it may with advantage be employed hypodermically not only in cases of tetanus from strychnia, but also in traumatic and spontaneous tetanus. (*Le Praticien*, Jan. 27, 1879.)

**Oxalate of Cerium in Pertussis.**—Dr. Morjé, in accordance with Dr. Clarke's recommendation, has tried oxalate of cerium in the spasmodic stage of whooping-cough. The results which he has obtained are excellent. Not only was the frequency of the attacks reduced, but their intensity was also lessened in each case, giving the patient a good night's rest, and invariably shortening the second and most severe stage of the disease. The remedy was employed in ten cases, of which seven were females. Two of the cases were complicated with other diseases. The mode in which the oxalate of cerium was administered was always the same, a single dose each day before breakfast. The ages of the patients under observation ranged from one to seven years, and the oxalate was administered in half-grain to three-grain doses. In every case the remedy was continued one week longer than there was any existence of the whoop, to obviate the possibility of a relapse. The advantage claimed for oxalate of cerium are that it decreases the attacks, and thereby reduces the violence of the disease, often checking it instantly. It is easily administered, as only one dose is required in the twenty-four hours. Nocturnal quietude is ensured. The possibility of complications is lessened. (*The New York Med. Record*, July 19, 1879.)

**Cysticerci Diagnosed During Life.**—Dr. Pollak records a case of this character. The patient was a boy eight years of age. Examination of the pulse, temperature, thoracic and abdominal viscera, failed to reveal anything abnormal. The boy complained of excruciating headache, and his piercing cries were loud enough to be heard at a considerable distance. Very shortly after the first visit, the medical attendant was recalled, when the pupils were found to be dilated, the urine and fæces were being passed involuntarily, the abdomen was distended, the headache was still severe. Every few hours attacks of an epileptiform nature occurred, whilst in the intervals there was a remarkable absence of all these symptoms. At one of the visits just after prescribing a cathartic, the medical man had occasion to examine the stools, when portions of a tænia were observed. The presence of this in connection with the other symptoms at once aroused the suspicion that the disease was caused by entozoa. The patient soon afterwards became comatose, and on examination of the pupils a cysticercus was discovered in the anterior chamber. The case was therefore pronounced to be one of cysticercus in the brain. The patient died shortly afterwards, when the diagnosis was fully verified. (*Wiener Med. Press*, No. 47, 1878, *The St. Louis Med. and. Surg. Journ.* July 1879.)

## Department of Public Health.

### ON THE RECENT OUTBREAK OF PLAGUE IN THE PROVINCE OF ASTRAKHAN.

REPORT OF THE BRITISH COMMISSIONERS, SURGEON-MAJOR  
COLVILL AND DR. J. F. PAYNE.

[THE following extracts give the substance of the Report, presented to the Lord President of the Council, by Surgeon-Major Colvill and Dr. J. F. Payne, on the results of their recent visit to the plague-infected district on the Volga in accordance with instructions of the Privy Council. Mr. Colvill and Dr. Payne were recommended for this important duty by the Royal College of Physicians. They left England on the 11th March, 1879, and reached their destination on the 1st April.—ED.]

#### *Reported Plague at St. Petersburg.*

TZARITZYN, ON THE VOLGA, April 1, 1879.

While at St. Petersburg, we thought it advisable to investigate the rumours respecting the occurrence of plague in that city, which had appeared in medical and general newspapers, and M. Rosow introduced us to Dr. Froben, Director-General of Hospitals. Dr. Froben received us cordially, and promised us all the assistance in his power.

In answer to our inquiries, he stated that there were not, and had not been, any cases of plague in St. Petersburg, either in the hospitals or elsewhere. It had been announced, he said, that a case of plague had occurred in the Clinical Hospital, under the care of Professor Botkin, one of the most eminent

physicians of St. Petersburg, but that an official Commission of Inquiry, in which Dr. Froben himself had taken part, had pronounced the case to be of an entirely different character, regarding it as an inflammatory attack connected with syphilitic disease. To this case we shall again refer.

Dr. Froben further assured us that no other cases of a similar character, such as could give rise to a suspicion of plague, were known to him, nor did he believe that such cases existed. At the same time he offered us any facilities we might desire for inspecting the hospitals. We took the opportunity of inquiring of Dr. Froben the meaning of the term "Siberian plague," which occurred in the newspapers, and which might give rise to suspicion or alarm. We were informed that by "Siberian plague or pest" is meant a disease of horned cattle, which is very destructive to them, but is only exceptionally transferred to the human subject. It appears to resemble, though not in Dr. Froben's judgment to be identical with, the well-known splenic disease "mal de rate." When transferred to the human subject, it produces an affection closely resembling what is known as "malignant pustule." In St. Petersburg the cases which occur in men and women are chiefly due to direct contagion from hair or hides of infected animals, and it is never known to be transferred from one human subject to another. Dr. Froben would have been glad that we should see some cases of the disease, but at that time none were to be found in any of the St. Petersburg hospitals.

In order to examine into the case which had been reported by Professor Botkin to be one of plague, we called on the Professor, both at his own house and at the hospital, but failed to find him. He was, however, so good as to call upon us the next day at our hotel, and explained to us at some length his views on the subject. It will be unnecessary to enter into all the medical details which were discussed. The principal facts were these: the patient, a wood-carrier or porter in one of the barracks of St. Petersburg, was admitted under Professor Botkin's care into the Clinical Hospital, suffering from swellings of the lymphatic glands, or buboes, an affection which, though it may arise from many causes, among others from syphilis, is among the symptoms observed in Levantine plague. The

Professor's opinion was that, in this case, the symptoms indicated a mild form of infection with the miasma of plague, and if not properly deserving that name, must at all events be referred to a particular form of glandular disease, which he stated to have been observed before and during epidemics of plague in various places. In this sense, such cases, even if not numerous or fatal, might be of great importance, as being possibly forerunners of a destructive epidemic. Professor Botkin further stated that he was acquainted with eight cases, either falling under his own immediate observation or under the care of other physicians, which had given rise to similar suspicions. From the particulars stated by the professor himself, it was, however, clear, that in some, at least, of these cases such suspicions were groundless, the symptoms being evidently explicable by other causes. The position of Professor Botkin entitles his opinions to respectful consideration. We report them, therefore, without comment or criticism, but without committing ourselves to any agreement with them. Being desirous of seeing the patient in question, whose case has now acquired considerable notoriety, and has given rise to a great deal of controversy, we obtained permission from Professor Botkin, and went at once to the hospital. The patient was, at the time of our visit, so far recovered that it was difficult for us to form from direct observation any opinion respecting his case. He had already been more than three weeks in hospital, and his most serious symptoms had occurred before admission. He was now, indeed, practically well. He showed traces of glandular swellings or buboes, but no present signs of syphilis or any constitutional disease, nor any other symptom which could throw light on the origin of these glandular swellings. Our opinion had, therefore, to be formed chiefly from his history. This history was derived partly from the clinical records preserved in the hospital and submitted to our inspection, and partly from statements made to us by Professor Botkin and his assistants. From this it appeared that the patient had suffered from one form of syphilitic disease some years before, and that the symptoms for which he was admitted to the hospital were of some weeks' duration. It should also be stated that no connection with any infected district could be made out. Our

conclusion was that the glandular swellings were the result of simple inflammation of unknown cause, having possibly some connection with previous syphilitic disease, but that the whole history and course of the attack afforded no reason for regarding the case as one of plague, and were indeed inconsistent with that disease. Another case, which had just been admitted to the hospital and had not yet been carefully examined, was also shown to us, as having given rise to the suspicion of plague, but it had plainly no connection whatever with that disease. We have, therefore, no ground for believing either that cases of plague exist or have lately occurred in St. Petersburg, nor that any form of disease has been observed there which affords any sufficient reason for expecting an outbreak of plague.

*The Infected District.*

ASTRAKHAN, April 28, 1879.

We left Tzaritzyn on the 3rd April for the infected district, and, having followed the post road along the right bank of the Volga as far as Kosakinski, we there crossed the river, visited the town of Selitrenoi, and having examined the marsh land in the bed of the Volga, we returned to the right bank and entered quarantine here at Zamian or Zamianowka on the 14th. Before beginning medical details we consider it desirable to give some description of this portion of Southern Russia, as it is but little known. This may be done generally with the two exceptions of the German colony of Moravian Brethren at Sarepta, and the bed of the Volga; and with the help of an itinerary in the appendix, we hope to make our account intelligible. The Volga in this part of its course, besides the main navigable stream, has what may almost be called a net-work of channels flowing in a bed only slightly raised above the surface of the water and from twelve to thirteen miles wide. Both banks of this bed (bed of the river)\* are generally abrupt, and, though varying, may be considered 100 feet high. From the right bank extends a great cultivable plain many miles broad, bounded—the upper half by the steppe occupied by the Don Cossacks, and the lower half by the steppe inhabited by the Kalmuks; while from the left bank stretches a corresponding

plain bounded by the Kirghis steppe. These two plains are occupied by a Russian population collected in villages on both banks, a very few—only small villages, from forty to sixty miles apart—being found scattered over the plain inland and depending on ponds and wells for water. To describe one Russian village is to describe all we have seen. It is simply to suppose the farm-houses and buildings of a given tract of land, instead of being scattered over the ground, collected together and combined into what would here represent the district hamlet, consisting of the church, with its invariable green dome and belfry, looking in the distance like a mosque, the post-house, windmills to grind corn, but for village consumption only, and a few shops. To describe one house or cottage is to describe all, for we have not met half-a-dozen brick buildings on our journey here, and if the proprietor, becoming richer than his neighbours, has desired to show his wealth in a more pretentious dwelling, it is by a development of the cottage, and not by any fundamental alteration in the mode of construction. The Russian cottage, then, is a log dwelling, made entirely of trees split up the middle with a plano-convex edge bevelled off, so that, when one log is laid on another lengthways and edgeways to form the wall, from one to two inches breadth of surface is in contact, and the recesses thus formed between the convex surfaces of the log are filled in with a cement of clay, lime, and straw. The convex surfaces of the trees are turned out, and at the angles of the house dovetailed one into another. The roof is sloping, covered with planks, and generally thatched. The rooms are usually three in number; one twenty feet by eighteen, and the other two together equally large, and the whole is lined—ceiling, floor, and walls—with wood, and as strongly and carefully finished as if a ship were being built. But what is more to our present purpose is that these cottages stand from two and a half to three feet free and clear above the ground, the whole fabric resting on pieces of trunks of trees placed in the earth vertically from eight to ten feet apart. A cottage is worth about £40. The cottage is placed generally gable end on to the street, and by the side is a large gateway opening into its courtyard, which is surrounded by thatched stables and sheds of wood or hurdle, and its surface covered with manure. The interiors of the

cottages we entered by chance were pictures of neatness and cleanliness. In many cases the rooms were papered. There were four-post bedsteads with curtains, curtains at every window, small tables generally along the walls, abundance of chairs, and the cupboards full of plates and glasses. There were no carpets; the floors were very clean, and every room had one, and often two or three icons. The stove, which usually heated all three rooms, was the only disagreeable part of the arrangement, for it kept the temperature at 81° Fahrenheit. These cottages appeared to belong rather to people in the lower middle class of life than to farm-labourers. These cottages, grouped together in varying numbers, with an open space for the church, constituted a village. The grave-yards are invariably apart from the houses.

There is no place in any of these villages for storing water; it is brought up for daily use from the bed of the river in wooden casks mounted on carts, or carried by women in iron buckets. Besides farming, the villagers fish, and the richer few own fish-curing sheds, where they employ Kalmuk men and Russian women. A large open boat with square holes cut in her sides is covered with net and sunk in the river, and the fish immediately on being caught are put in till a sufficient quantity is collected to send to the fish-curing places. These fish-curing sheds, called "watagas," are not as a rule close to any of the villages, for it is remarked that the one since pulled down in the village of Vetlanka was a singular exception. To describe a wataga is to suppose a number of tanks about ten feet deep, and almost cubical in form, constructed of thick planks or beams placed side by side in the ground and covered over with loose planking, which forms the floor of the shed. These tanks communicate with one another when required. In the shed the fish are packed in barrels made on the premises. One could suppose few processes more simple or cleanly, but it would appear that from the high duty on salt these tanks were never cleaned, and became highly offensive. The finest kinds of fish are put in ponds to live till frozen, when they are dug out, and, hard as ice, sent to the cities for sale, and we saw frozen fish sold in the Moscow market. One man may own more horses and let them to his neighbour, or besides his cultivation he may have a windmill, but taken as a whole

the people are very much of the same degree. There is no sort of manufacture; a woman may occasionally knit a pair of stockings with cotton thread as brought from Sarepta, but it is said to be much easier to buy imported goods than to take the trouble of making anything. It seems as if these villages had reached the height of their prosperity, for the population will probably increase, the land, which is never manured, must in time get exhausted, and the fish, which are captured indiscriminately in such quantities, and especially for the roe during the whole season the Volga is not frozen, will in time disappear. Wood and brushwood are to be found in the bed of the Volga only, and in the clefts of the mounds in the steppe. The plain is quite bare. The villagers are permitted to cut as much wood as they require, but they are not allowed to sell any. As the cultivators have often a considerable distance to go to their land they remain there for days, and are supposed to be out in the open, but that is a mistake, for they take their carts with them, and carry besides hay, water and provisions, hurdles with which they hut themselves comfortably, and instead of exposure it is a pic-nic. Each plough is drawn by eight oxen, with one man in the stilts and two to direct the oxen. It is on two wheels, and the culter is of iron. The furrow made is slightly deeper than that in the East, but mere scratching compared with ploughing in England. As every one in authority speaks of syphilis being rampant and innocence unknown, there must be some truth in the invariable statement, though we should think there should be some sign of its after effects in the men, who are so handsome, well-grown and clean-limbed; in the women, who, if not good-looking, certainly appear healthy and square built; or in the blue-eyed light-haired children, so plump, fair, and without a spot. The signs of comfort, candour and happiness amongst these people belie the statement of the authorities. Still it must be remarked that here in Zamian, where a number of men and women are undergoing quarantine on their way to the fisheries, they are indiscriminately huddled together, living and sleeping in the same tents. Four-wheeled carts are the almost universal mode of conveyance, and seem admirably adapted for the purpose. Horses abound, but even those of the troopers and their officers are the ugliest brutes we

have ever seen ; small ragged ponies with goose rumps, enormous heads, long ears, very small eyes and big tails, and mane of coarse hair. The horses of a troop of Cossack cavalry, in quarantine with us, have been our study for days ; neither Arabia nor Persia could furnish such wretched specimens, and for a comparison we should have to revert to the grass-cutter's ponies that follow our cavalry regiments in India. There are no donkeys. The oxen are small serviceable-looking beasts, and appear to do good work both in the cart and plough. Sheep are abundant, and look more acclimatised than any other quadruped, except the pig, which revels in the refuse of the village, and appears in herds in the swamps in the bed of the Volga. Fowls are abundant, turkeys and geese plentiful ; guinea-fowl as we came further south, but no ducks.

In short, there is prosperity and plenty inside the villages, and peace outside, for, with the exception of officials, all men, are unarmed, and women may be seen wandering alone from village to village. With a little attention to simple sanitary measures, healthiness would fill up the measure of the blessings this people enjoy. The space of from two-and-a-half to three feet between the ground and the floor is an admirable arrangement, but neutralised by the fact that the outer wooden walls of the cottages rise from the ground, shutting in the space thus formed ; and this house wall is usually itself inclosed by a bank of earth resting against it, rising three or four feet from the ground and held in position by hurdles, so that free circulation of air underneath is denied. There are usually no latrines, and not only is the excrement of man and animals collected in the courtyard, but all the refuse of the house, liquid and solid, is thrown there, and every cottage is in the midst of a dunghill, for on two sides it has its own collection, and on the third side its neighbour's, while the road forming the fourth side is simply a portion of the plain in a state of nature, but sodden with solid and liquid manure. Were the value of manure appreciated in agriculture not only would the land benefit, but the villages would then be periodically cleaned. The high temperature kept up by the stove in the rooms is not only objectionable in itself, but as the windows are double and closed by cement, and the doors lined, and closed with felt, the draught for the

stove comes probably for the most part from between the planks in the floor, that is from the atmosphere confined in the space underneath. There is no slope on these plains for drainage, but the ground seems so dry that with ordinary cleanliness the villages might be kept healthy for many years, and the present sudden display of sanitary activity on the part of the authorities is simply an attempt to do what ought never to have been left undone; for with people so intelligent it appears certain that had they only known the necessity for it they themselves, with the transport at their disposal, would willingly have kept their villages clean. Should plague reappear in the country around Vetlanka, and Vetlanka and the other villages previously attacked, and now with so much parade submitted to exceeding purification, be free, too much stress must not be laid on the effect of the sanitary measures so energetically carried out, for we know from the history of the spread of plague that when it reappears after being dormant it does so in a wider area, and the points originally attacked, though left in their original condition, are free from the disease. In those villages, cleaned by official orders, the refuse of years has been disturbed in presence of a grave epidemic, removed from the courtyard, and exposed to the atmosphere by being thrown over the bank, but not into the river or spread on the plains in the immediate vicinity of houses, while the freshly-exposed surface of the courtyards, though apparently clean, must be anything but virgin soil.

The first exception made in the beginning of this Report is Sarepta. The history of this German colony of Moravian Brethren is written by Alexander Glitsch, school inspector and under-preacher in the village, in a work printed in Berlin, and published at Sarepta in 1865. It will be sufficient for our purpose to say that the colony was founded in 1765 by a small party of settlers, and that it now numbers 500. The death-rate at present is 22 in 1,000, and the reason given for the comparatively slow increase is that the young men finding no field go elsewhere, while the maidens are left behind. It is singular in this district in having two steam-mills for grinding mustard-seed, and 288 tons of mustard, sufficient, it is said, to supply all Russia, are turned out every year. Most of the seed

is brought in by Kalnuks from the steppe. The Crown granted this colony 44,330 acres of land, but not quite one-fourth can be cultivated and pay the Government tax. Here, and indeed down the Volga, the water-melon is grown, showing that while the summer lasts it must be very hot. Rain, it is said, is but sufficient for grain, and not unfrequently deficient. The village is placed on the outer bend of a low hill, the border of the steppe, which here suddenly recedes from the river. One or two springs issue from the base of this hill, and the water is carried in pipes to the houses. The village is very clean, and composed of well-to-do people; still whooping-cough, measles, and scarlet fever are common, and small-pox by no means unknown; but when cholera has travelled up the Volga from Astrakhan to Tzaritzyn, Sarepta has always escaped, except on one occasion, when it was feebly attacked.

The second exception made is the bed of the Volga, which we crossed from Kosakinski to Selitrenoi, nearly opposite. In a large canoe we threaded our way amongst sand-banks bearing trees and brushwood, with here an occasional village of half-a-dozen cottages, or a fish-curing shed, to the main stream of the Volga, which we crossed at Ntchuchneya. This little village is on the edge of the main stream, and between it and the left bank, eight miles distant in a direct line, is low marsh land. Though within less than a month of the annual rise of the Volga, and though neither snow nor rain has lately fallen, this low land, which follows the course of the river up and down, is not only green and damp, but resembles marsh land, intersected with swamps and patches of reeds, and sprinkled with fresh-water shells from the yearly inundation. Looking at the herds of swine, which here, however, are tame, rooting, it was difficult to believe we were not on corresponding ground in Mesopotamia. Wild duck abound. In the history of Sarepta it is mentioned that small German colonies formerly settled on this low ground, but were decimated by the unhealthiness of the situation. This land is too damp to produce grain on any part of it, but rank grass grows abundantly, and it is dotted over, at intervals of about a mile, with what may be called grazing farms, inclosures of hurdles, and sheds for cattle, where the constant accumulation of dung, unrenewed, unless required for fuel, raises

the level of the station year by year. The huts for Russian inhabitants are of wood, or hurdle plastered over, and wretched indeed, while the winter home of the Kalmuk attendants is at least four feet underground. The whole is surrounded by an embankment resting against the buildings to keep out the river at its height. From the middle of May the Volga rises, and in June is at its height, and during the latter half of July and August it has again retired and left this tract of land still more a swamp. This portion of land might be considered an island in the low season, for a channel of the Volga, called the Ach-tuba, leaves the main stream higher up, and running under the left bank falls as a separate river into the Caspian Sea. Six miles higher up than where we crossed, but through which we recrossed, an apparently undefined portion of this marsh ground is called Kapitanski, and on it we found the remains of Lapiroff's farm, to be afterwards referred to. This farm, probably bearing the description we have given, had been fired from the upper end when the wind was in the north, for a portion of a shed and one or two hurdles remained, and not only were two piles of dung dried for fuel burning, but the surface of the ground was on fire, showing the great thickness of the manure deposit, and this fire will probably smoulder for a month if neither the rising river nor rain extinguishes it. It is true the walls of these farm-houses are thicker than the reed huts on the Euphrates, but they rest on the ground with no spaces underneath, as in the houses on the mainland. They are entirely of vegetable matter; not a cart-load of bricks, and those probably the remains of stoves, could be found on the site of Lapiroff's farm. The surrounding country is undoubtedly a marsh. In May and June the river will be above the site of these farms and communication with them will be possible only by boats. In July and August, the river retiring, the country will be even more of a swamp, with a temperature sufficient to ripen water-melons. This is not a mere patch of land; it is true that it is but eight miles broad, but we have seen and heard of it during our journey here; it will follow us to the Caspian Sea, and it probably extends much higher up than where we met the river. We have both of us felt its evil influence by being attacked with ague. If it is said that in winter the

Volga is frozen and the land ice-bound, the high temperature at which even the poor keep their rooms must be remembered, while the Kalmuks living underground reap to the full the ill-effects of moistened manure. Difference of latitude and race taken into consideration, these facts remind us forcibly of the permanent marsh villages on the Euphrates, where plague appeared. We suspect the month of August will be the time most to be dreaded here.

*General Report.*

All that follows regarding the medical history of the outbreak of plague in this district was got from officials and medical Government officers as the result of their investigations, and also from conversations with the natives of the villages who themselves had seen the disease. Neither we ourselves, nor indeed any of the foreign Medical Commissioners, nor the Russian Medical Commission itself, saw anything of the epidemic except the solitary case of the little girl at Vetlanka previously referred to, whom two of the foreign Commissioners and we ourselves saw—the epidemic having ceased long before any of them reached the spot. Only one medical man survived who had seen anything of it at Vetlanka, and that towards the end, when he declared it was not plague at all. This gentleman we had not the pleasure of meeting.

We have endeavoured to put ourselves in relation with the Russian and foreign Commissioners, but on arriving in this district found that a great part of the Russian Commission and most of the foreign Commissioners were already gone, and on comparing dates we find that they must have left Vetlanka about the 17th March. As they were thus travelling along the same route three weeks in advance of us we have not of course overtaken them.

At Tzaritzyn we met the Swedish Commissioners, Dr. Duner and Dr. Malthe, and the Danish Commissioner, Dr. Feilberg. At the upper Quarantine Station at Graczevka we met Dr. Kiemann, one of the Austrian Commissioners, who had returned to the infected district to observe the last case of the plague—that of the little girl before mentioned.

At Astrakhan we found Dr. Cabiadis, the Turkish Commissioner, and on our return to Tzaritzyn found there one of the French Commissioners, M. Lallemand. At Selitrenoi, and afterwards at Astrakhan, we met Professor Jacoby, the second in rank of the Russian Commission. We learnt also that though the term "International Commission" was used there was really no Joint Commission, the Russian and foreign delegates having decided to act independently, though some of them travelled in company.

The chief or only loss we have suffered from not meeting these Commissioners is that we have not had access to certain statistics, which, as afterwards explained, we were told had been carried off to St. Petersburg. On the other hand we have had the advantage of being more independent in our movements. With one exception we believe that all the foreign Commissioners on arriving at Astrakhan took the steamer up the Volga and went home. The exception was the Turkish Commissioner, who passed over the Caucasus to Tiflis as being the nearest way to Constantinople.

### *History of the Epidemic.*

We have as far as possible collected information respecting the history of the late outbreak of plague in the district, but our knowledge is not so complete as we could wish. The authorities have not in any instance refused us information, but in some cases we were told that the statistics which had been collected were in charge of Professor Eichwald, Chief of the Russian Commission, and had been taken by him to St. Petersburg. As we have elsewhere explained, we did not meet Professor Eichwald, but we are assured that the information shall be made accessible to us, either in print or otherwise.

The following short sketch is, therefore, neither complete nor precise; but having served us as a clue in our own inquiries, it may be of use in making other parts of our Report intelligible.

The epidemic last winter was, so far as is known, confined to seven villages: four on the right bank of the Volga—Vetlanka, Prischibinskoi, Nikolskoi, Staritzkou, and three on the left—

Selitrenoi (with which is included a scattered hamlet—Kapitanski, in the bed of the Volga), Michaelowka, and Ubaczua. We visited or passed through all of these except the last two.<sup>1</sup>

In the seven villages, the total population of which might be 10,000, we are told by Count Loris Melikoff that about 480 people are believed to have died. Of the 480 deaths about 360 are set down to Vetlanka alone, out of a population estimated to have been before the outbreak about 1,700, and next to Vetlanka, Selitrenoi suffered most, the number of deaths being 35, while in the other villages the numbers were inconsiderable. It is clear that there is some confusion in these numbers, as the items do not tally with the total, and perhaps in the 480 deaths are included some from other causes than plague.

The attack is said to have begun at Vetlanka in October, 1878. The disease, as at first observed, consisted in fever, accompanied by buboes (or inflammatory swellings of the glands), which were almost always in the thigh, and continued to present this type through October and November, without, it is said, causing any great mortality. Suddenly about the 8th December the character of the disease is said to have changed. Congestion of the lungs and spitting of blood became prominent symptoms, and buboes either did not occur or were not observed in consequence of the rapidity of the fatal course of the disease, which carried off its victims after one, two, or three days' illness. The total mortality also became much greater, thirty or forty persons dying daily in the village. The three doctors in the place all died, and also the priest, so that it was natural that panic should prevail; and when another physician, Dr. Krassowsky, was sent down by the Government, he found that many bodies had remained for days unburied. This extreme severity of the epidemic lasted till about the 1st January, 1879, when it began to decline.

It is worth noting that Dr. Krassowsky for some reason would not hear of the disease being plague, but called it "epidemic pneumonia." What opinion was formed by the

<sup>1</sup> In the map given us by Count Loris Melikoff, a place called Prijutnaya, in a distant part of the Province of Astrakhan, on the Kalmuck Steppe, is marked as one of the seats of the epidemic; but this would seem to be a clerical error, as we could hear nothing of plague having occurred there.

doctors who had observed it from the first we cannot say, as they died without, so far as is known, leaving any records behind them. Some valuable information is said to be contained in a journal kept by the priest, which has come to light, and which, it is to be hoped, may be published. The epidemic in Vetlanka virtually came to an end about the end of January, 1879. We do not know the precise date of the last case. About a month later another case occurred, which was fatal through inflammation of the lungs, and after another month another solitary case occurred—that of the little girl of whom we heard from Count Loris Melikoff at Tzaritzyn, as mentioned in our last Report. We then heard that the child was convalescent, and when we saw her at Vetlanka she was quite well, though showing the scar of a bubo in the left thigh. It was said she had been feverish for two days only, and that the doctors, foreign as well as Russian, who saw the case at the beginning hesitated to call it one of plague. Taking the appearances in connection with what we have heard we should, however, incline to the opinion that it was a mild case of plague, though we have not the materials for a positive diagnosis.

We also saw at Vetlanka some persons who had recovered from attacks of the epidemic in the winter, and talked through our interpreter with the relations of others who had died. These observations and reports left no doubt in the mind of one of us that the disease which had prevailed at Vetlanka was the same as he had previously observed in Mesopotamia. We must therefore coincide in the opinion expressed by the Russian physicians that an epidemic of true or Levantine plague occurred at Vetlanka last winter. Of the other affected places on the right bank of the Volga, Prischibinskoi and Nikolskoi lie nearest to Vetlanka—the former six, the latter fourteen miles distant.

We do not know the precise number of cases in Prischibinskoi, but it was not large. In Nikolskoi there was but one case. We could get no account of the introduction of the disease into these villages, but considering the small distance from Vetlanka, and considering the disease only appeared in those places after it had become prevalent in the latter, it seems

to be taken for granted that Vetlanka was the source from which these other villages derived the infection.

In Staritzkoi, which is sixty miles distant from Vetlanka, there were nine cases of death, but with regard to two it seems doubtful whether they were actually the same as the other seven. Here a very circumstantial history is given of the introduction of the disease from Vetlanka. A woman aged sixty, whose home was fourteen miles from Staritzkoi, is said to have been at Vetlanka, and on her return to have passed through Staritzkoi, where she was taken ill. Her illness turned out to be the plague, and was fatal. Her death was followed by the deaths of another woman and child in the same house, and fatal cases afterwards occurred in two other houses. No case of plague had previously occurred in the village.

It is clear that the importance of this story must depend upon several minute details which we have not got, and the doctor in charge of the village (who was not himself there during the epidemic) much objected to our making inquiries among the inhabitants. The first death at Staritzkoi occurred on the 27th December, 1878, the last on the 16th January, 1879. We did not hear how many, if any, cases recovered, but the information we obtained here was confused, and did not inspire us with confidence.

This is the only instance, with one exception now to be mentioned, in which any circumstantial history is offered of the conveyance of the disease from Vetlanka to any other village.

The epidemic at Selitrenoi, on the left bank of the Volga, presented several remarkable features. The first death was on the 20th January, 1879, and the last on the 9th February. It carried off in the village thirty-three or thirty-four persons. There were thirty-five deaths, but one or two, it is said, from other causes. We were told, we believe with truth, that no one attacked by the disease recovered, and that in the houses affected scarcely any one escaped. There was also a striking connection between Selitrenoi and a place on the marsh land in the bed of the Volga, called Kapitanski, of which we have spoken in the portion of our Report sent from Astrakhan, so that not only did a considerable portion of the deaths referred to Selitrenoi really belong to Kapitanski, but in the case of

several deaths which actually took place in Selitrenoi itself there was a clear connection with Kapitanski.

We were told at Selitrenoi, both by the inhabitants (including the priest) and by one of the superior Russian Commissioners, that the conveyance of the disease from Vetlanka could not be in any way traced, but we have since heard that there is a story claiming to show that the disease did spread from Vetlanka, which must, therefore, be considered.

The first person to die of the epidemic in Selitrenoi was an elderly man named Plaxin (or Aplaxin), in whose house there lived also his wife, a little boy, an old woman related to the family, and another family, consisting of the father (a shoemaker) and two children. In the next house (very closely connected with this) lived Plaxin's son, Dimitri, and his wife. In these two houses every person died except one of the shoemaker's children, who did not take the disease.

The story we heard from the priest at Selitrenoi, and from others there, was that Plaxin came back ill from a journey which he had taken to sell fish. He had been to a place called Saskali, where there has been no plague. It is however said in Vetlanka that Plaxin, who was known to the postmaster there, was seen in Vetlanka about the 31st December, and stayed there four or five days. This entirely conflicts with the other story, which makes him come back ill from Saskali eight days before his death, which took place on the 20th January.

We cannot possibly reconcile these discrepancies, but can only point out that at the time assigned for this visit to Vetlanka there was supposed to be a strict sanitary cordon round the place, through which he must have twice passed, and besides, the epidemic must, one would think, have made people rather timid about going there. Moreover, our informants at Selitrenoi were positive that Plaxin had not been at Vetlanka.

The next death was that of Plaxin's wife, and the next his son Dimitri, who is said to have been taken ill after returning from Kapitanski, where he had spent the night at Lapiroff's farm, elsewhere spoken of. Since immediately afterwards a

destructive epidemic broke out on this farm the view here is that the disease was conveyed there by Dimitri Plaxin, especially as the elder Plaxin was already ill and died shortly after the son left for Kapitanski.

It is clear, however, that a slight difference in dates might give an entirely different aspect to the story, and that the infection might have been brought back by the younger Plaxin from the farm and transmitted to his family. Whether, therefore, the disease was transmitted from Selitrenoi to the farm or *vice versa*, or whether it arose spontaneously in both, we should find it difficult to say. It is useless to expect accuracy of dates after a lapse of some months, and the story now told must have received some bias from the cross-questioning our informants had already undergone.

We now pass to Kapitanski, where the disease is said to have broken out after the visit of the younger Plaxin, and the connection of which with the epidemic in Selitrenoi is from any point of view very remarkable. In the farm belonging to a certain Lapiroff there were living seventeen persons—twelve Russians and five Mongols, all of whom died of the epidemic, eight on the spot and nine after having been removed ill to Selitrenoi, where they were placed in houses used as hospitals, carefully isolated. These persons were Andrew Lapiroff and his wife, who was brought over to Selitrenoi and died there, Lapiroff's mother and his little daughter, who died at Kapitanski, Lapiroff's father, who died in a hospital at Selitrenoi, a cousin of Lapiroff's, who died on the island, and his family, consisting of six persons, who were brought over to Selitrenoi, and all died in a house which had been emptied to receive them. The five Mongols (Kalmuks and Kirghizes) were believed all to have died on the spot. A man named Rischatoff is also said to have come back ill from Kapitanski, and to have died in Selitrenoi. In the house of a certain Kashkaroff the man himself and two other persons died. His wife did not take the disease. In another house, that of Kastamaroff, the whole of the household, consisting of four persons, died. The wife of a man named Lapiroff (not related to the others) died during the epidemic, but whether of plague was not quite clear. Her husband was compelled by the authorities to leave his house,

and did not take the complaint. In the last three cases we do not know of any connection with Kapitanski or the marsh land, but it should be stated that the people at the latter place all go to church at Selitrenoi, and get their supplies from the shops there. The above enumeration, including all the cases at Selitrenoi, shows the extreme fatality of the epidemic, and its close connection (however this may be explained) with the marsh land in the bed of the Volga. We were informed that no buboes were observed in any case, although the epidemic was all along under medical inspection. No connection, it was then believed, could be traced between Selitrenoi and Vetlanka. From these facts some doubt is entertained here whether this disease was really the same as that at Vetlanka. It appears, however, to have closely resembled the more severe form of the epidemic at the latter place. The particulars given above were collected from the chief police officer, the priest (who was very intelligent and communicative), and a woman named Lapiroff, related to some of the deceased, also by inquiries made at Kapitanski itself. While we were at Selitrenoi we heard that a man died after a very short illness, and as the nature of the case appeared doubtful a *post-mortem* examination was held, which we were invited to attend. Of this we have given particulars in an appendix.

We have no information about the two other places on the left bank of the Volga, viz., Michaelowna and Ubaczna, where plague is said to have occurred, but were told that the number of deaths was insignificant; one or two in each village.

(To be continued.)

## THE PRACTITIONER.

DECEMBER, 1879.

## Original Communications.

# A CONTRIBUTION TO THE THERAPEUTICS OF STARCH-DIGESTION.

BY WILLIAM ROBERTS, M.D., F.R.S.,

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THE digestion of starch consists, as is well known, in its conversion into sugar and dextrine. By this change starch becomes soluble and diffusible, and thereby adapted for absorption from the alimentary canal. It is further known that this conversion is effected partly by the saliva and partly by the pancreatic juice, and that the actual agent of the transformation is a special ferment contained in these secretions. As regards saliva, the ferment goes by the name of ptyalin, and is held to be identical with the diastase of malt. The corresponding pancreatic ferment has not received a distinctive name; indeed, until recently it was not thought to be a separate body; it was rather supposed that the pancreatic juice contained a single ferment which possessed manifold powers, and was able at the same time to peptonize proteids, to emulsify fats, and to convert starch into sugar. It is now, however, ascertained that these several powers

correspond to separate ferments. The question has, as yet, been scarcely raised as to whether the diastatic agents of the saliva of the pancreas, and of malts, are one and the same ferment, or whether there are not more than one—perhaps several—modifications, all capable of doing similar work. It may be regarded as probable, in view of certain recent observations, that the latter supposition will turn out to be correct.

As regards the pancreas, I have obtained evidence, which I need not here particularise, that its diastatic agent is a distinct body from that of saliva and malt. Until further inquiry it will be convenient to use the word "diastase" as a common term, signifying an anylolytic ferment—that is to say, a ferment having the power of resolving the starch molecule into more diffusible bodies of the sugar and dextrine class; and we may conveniently designate diastatic agents according to their local source as malt diastase, salivary diastase, pancreatic diastase, and so forth.<sup>1</sup>

Before diastase can exercise its power the cellulose investment of the starch granule must be ruptured. This is accomplished for the human subject by the art of cooking. In boiling and baking the starch-granules break up under the combined influence of heat and moisture, and the liberated starch swells out enormously by imbibition of water into a mucilage or jelly-like mass. Unless starch is previously changed into this gelatinous state it is acted on very slowly by the diastatic ferment. It is a matter of capital importance, therefore, in the sick-room, to make sure that gruels, puddings, and other farinaceous dishes prepared for the invalid are thoroughly cooked.

Having premised so much, I pass to the consideration of the means we possess of artificially aiding the digestion of starch in cases where that process is defective from deficient diastatic power in the saliva and pancreatic juice. Unfortunately our knowledge of the defect which it is proposed to remedy is very incomplete. Something, however, we do know with fair precision. We know that in infants under three or four months

<sup>1</sup> These three by no means exhaust the list of local diastases. There is a diastase in the urine, in blood-serum, in the liver, and several other tissues of the body: indeed diastase seems to be one of the most widely diffused of all the soluble ferments, both in plants and animals.

old the saliva has but a feeble diastatic power. I have further ascertained the significant fact that the pancreas of suckling calves is inert on starch, and the inference is strong that the pancreas of the infant at the breast is in the same predicament. It is not probable that the diastatic power is wholly wanting in sucklings—seeing how widely this power is distributed; but it appears certain that it does not exist in sufficient amount to be available for the digestion of sensible quantities of starchy food.<sup>1</sup> This being so, it is obvious that farinaceous articles are unfit food for young infants unless artificial means are used to assist their digestion. With regard to older children and adults we possess very little exact knowledge respecting defective secretion of salivary diastase, and none at all respecting defective secretion of pancreatic diastase. We may nevertheless pretty safely conclude that whenever the mouth is dry there is diminished supply of salivary diastase. In the febrile state, in advanced stages of most organic diseases, after alcoholic excesses, and in a multitude of morbid conditions of various kinds, the mouth is dry and the saliva is scanty; and it is reasonable to infer that we shall be doing an important service to our patients so suffering by remedying this defect by artificial means.

In malted barley we have at command an unlimited supply of diastatic power, and it is not surprising that many eyes have been turned in this direction, and that many efforts have been made to utilise this resource as a means of assisting the digestion of starchy food when the supply of natural diastase is deficient. Of late renewed interest in the subject has been created by the introduction into pharmacy of a new class of malt preparations, which, under the name of “malt-extracts,” are now challenging the attention both of the profession and the public in a very prominent manner. It will be worth our while to inquire into the real value of these preparations which

<sup>1</sup> The earlier opinion, that the saliva of young infants was wholly wanting in diastatic power is not supported by recent researches. Both Schiffer and Korowin found that the secretions of the mouth of infants had a certain power of converting starch into sugar. Zweifel also found that the extract of the parotid (but not the submaxillary) glands of still-born children and of infants dying a few days after birth possessed this power, though apparently in feeble degree. Extract of the pancreas in the same subjects was found inert. (Zweifel, *Untersuchungen über den Verdauungsapparat der Neugeborenen.*)

have suddenly become so popular. The task is made easy by the opportune appearance of a valuable report on malt-extracts by W. R. Dunstan and A. F. Dimmock, and published in the *Pharmaceutical Journal* for March 9th, 1879. There is also a simpler and cheaper preparation of malt, namely, the cold-water infusion, which I desire to bring under notice. This latter preparation has not yet been formally introduced into medical practice; but its diastatic action on starch has been minutely studied by Mr. O'Sullivan, and by Messrs. Brown and Heron, in an important series of papers published recently in the *Journal of the Chemical Society*.<sup>1</sup> I propose to say something about both these preparations.

*Malt-Extracts.*—These articles are now manufactured on an enormous scale. No less than three limited companies exist whose sole business appears to be to make and sell malt-extract. The best brands—those that appear to command our English market—are Corbyn's, Kepler's, Trommer's, and the variety called "Maltine;" and the remarks I am about to make apply exclusively to these four articles, which may be regarded as practically identical in character and merit. Malt-extracts are essentially infusions of malt concentrated by evaporation to the consistency of a thick treacle. In order to preserve intact the activity of the diastase, which is destroyed by a heat exceeding 157° Fahr., the evaporation is conducted at a low temperature, *in vacuo*, by the aid of costly machinery, and this accounts for the high price of these preparations. Malt-extracts thus prepared are of a dark-brown colour, very thick and viscid, and possess an agreeable sweetish taste. Chemically they consist (besides water) of about 70 per cent. of a variety of sugar called "maltose," 2 per cent. of salts, a varying quantity of diastase, which, however, is incapable of quantitative determination, and about 6 per cent. of nitrogenised compounds. The exact condition of the nitrogenised matter is not known. Some of it, no doubt, exists as albuminoid material, but this does not seem to be in true solution, for I find that when malt-extract is diluted with three or four times its bulk of water a copious precipitate takes

<sup>1</sup> Contribution to the *History of Starch and its Transformations*, by Brown and Heron. (*Journ. of the Chem. Soc.*, Sept. 1879). The papers of O'Sullivan are published in the same journal for the year 1872 and subsequent year.

place, and the supernatant liquor shows only slight traces of albumen when tested with nitric acid. From these facts it may be gathered that the value of malt-extract as a food is but little more than so much syrup, and that the statements made on this point in the advertisements are ridiculous exaggerations. These preparations have, however, important uses as vehicles—especially as a vehicle for cod-liver oil—which they suspend in the most perfect manner, and render tolerable to some stomachs which cannot tolerate the oil in any other guise. But the proper medicinal value of malt-extracts must be held to depend entirely on the amount of diastase which they contain, and in this respect I found that the four brands already named were highly active, but not all equally so.

*Malt-Infusion.*—The cold-water infusion of malt is an energetic diastatic agent, and trials of its action on various farinaceous gruels have led me to believe that it may with advantage be added to our list of malt-preparations. I have adopted the following method and proportions as yielding a pharmaceutical preparation of convenient standard strength. Three ounces (or three piled-up tablespoonfuls) of crushed malt are thoroughly well mixed in a suitable vessel with half a pint of cold water. The mixture is allowed to stand overnight—that is to say for twelve or fifteen hours. It is then filtered through paper until it comes through perfectly bright. The above quantities yield about seven ounces of product. Malt-infusion thus prepared has a light-brown colour like sherry, a faint sweetish taste, and the odour of beer-wort. It is nearly neutral in reaction, and its sp. gr. is about 1025. It is rendered cloudy by nitric acid, showing that it contains albumen. Its chief solid constituent is maltose, and it is rich in diastase. I was surprised to find that the action on starch of the above standard malt-infusion was quite as powerful as that of average specimens of malt-extracts. This shows that in spite of all the precautions used in the manufacture of malt-extract, a considerable amount of the unstable diastase is rendered inert in the process of concentration. Malt-infusion is very prone to fermentation, and it must either be prepared fresh for each day's consumption, or means must be used to preserve it from decomposition. This may be easily accomplished by adding a few drops of

chloroform to the infusion, and keeping it in a well-corked bottle. If the taste and odour of chloroform thus communicated to the infusion be objected to, it may be obviated by pouring out the intended dose into a wine-glass two or three hours beforehand. The chloroform flies off in vapour, and the infusion is restored to its original taste and smell.

Preparations of malt may be utilised for their diastatic property in two ways: either they may be administered *with a meal*, so as to perform their mission during, and for a short period after, the ingestion of the food, or they may be *mixed with the food beforehand*, with a view to predigest the starchy matters before they enter the mouth. I shall consider these two methods separately.

1. *Administration of Malt-preparations with Food.*—The labels on the malt-extract bottles direct one or two dessert-spoonfuls to be taken *after* a meal. This is obviously a bad mode of utilising the diastatic powers of the preparation. A meal is often a long affair; the earlier portions may be in full digestion before the final portions have passed the mouth, and it must be borne in mind that diastase is rendered inert by the acid of the stomach, and that as soon as the meal is penetrated by the acid gastric juice the conversion of starch is arrested, and no further progress is made therein until it starts afresh in the small intestine under the influence of the pancreatic juice. When a malt-preparation is administered after a meal the dose is not properly mingled with the food, nor is it mingled at the right time. A better plan is to direct the patient to sip his dose of malt-extract, or of malt-infusion, as the case may be, during the progress of the meal. The object in view is to supplement the action of the saliva, and the artificial substitute should, like the natural article, be mingled with the food in the mouth so that it may have due opportunity for the performance of its destined work before its energies are checked by the rising tide of the gastric acid. Malt-extract is taken in doses of one or two dessert-spoonfuls diluted with water or milk. Malt-infusion may be taken in similar quantities and in the same way; or it may be added to the beverage which happens to be used with the meal, for it has little taste of its own. I may mention that malt-extracts, from their syrup-like consistence and flavour, are suitable for spreading

on bread or toast, or for sweetening any kind of farinaceous pudding, gruel, or porridge. An effectual commingling of the ferment with the food is thus ensured.

2. *Predigestion of Starchy Food by Malt-preparations.*—Some years ago Liebig pointed out with great force the advantage—or rather the necessity—of predigesting the starchy aliments given to young infants, and suggested a method of preparing a farinaceous “food for infants” by an ingenious process which was designed to completely transform its starchy ingredients into sugar and dextrine before the food was administered to the infant. This proposal of Liebig’s is historically interesting as the first successful attempt to provide human beings with food not only previously cooked, but also previously digested. Liebig’s plan in principle is this: Ground malt and wheat-flour are mixed together with a due quantity of milk and a little water to form a gruel. This mixture is heated over a very slow fire until it thickens, which occurs when the temperature approaches  $150^{\circ}$  F. At this temperature the starch granules swell out and burst, and the starch is gelatinised. At the same time the diastase is dissolved out of the malt, and acts energetically on the gelatinised starch. The gruel is now diligently stirred for some time, without increasing the heat, until at length, from the conversion of the starch into sugar, it becomes quite thin and diffuent. It is then raised to the boiling point, and when cool is ready for use.<sup>1</sup> This method is easy to the chemist in his laboratory who proceeds thermometer in hand. But it is otherwise when the operator is a cook or nurse, and the apparatus a saucepan and an open fire. The starch does not begin to gelatinise until the heat rises to about  $140^{\circ}$  F. Below this point the granules remain intact—at least for a long time—and the diastase cannot attack them in this state. On the other hand, should the temperature rise to  $150^{\circ}$  F. the diastase is destroyed by the heat, and the starch conversion is arrested in mid-career.

<sup>1</sup> Liebig also added a few grains of bicarbonate of potash to the ingredients in order to render the product more exactly equivalent to mother’s milk. This is a needless complication, and may be regarded as an example of Liebig’s passion for chemical symmetry, and his habit of looking at physiological questions too exclusively from a laboratory point of view. The diastatic action goes on perfectly well without the alkali, and its presence is as likely to hamper as to assist the further stages of digestion in the stomach.

If, therefore, this narrow range of some  $20^{\circ}$  F. be overpassed on either side the desired result is not fully attained; and to keep within this narrow range is too much for the rough chemistry of the kitchen. This is the reason why this admirably-conceived method has failed to obtain a more firm footing in the sick-rooms and nurseries of this country.<sup>1</sup>

All the difficulties, however, disappear if, instead of using the crude malt, we use the standard malt-infusion of which I have spoken. By this means Liebig's idea can be carried out to completion with perfect ease, and a much wider application can be given to it than seems to have been contemplated by its illustrious author. The mode of proceeding with the malt-infusion is as follows:—A suitable gruel is prepared from wheat, or other flour, or from oatmeal, groats, pearl-barley, arrowroot, or any other farina. The gruel may be made with water alone, or, as is more usual, with the addition of milk or some kind of meat broth. In either case the gruel should be well boiled, and strained to separate the lumps. When the gruel or broth is cold, or at least sufficiently cool to be tolerated in the mouth, the malt-infusion is added. One tablespoonful (well mixed therewith) is sufficient to digest half a pint of gruel. The action is very rapid; in a few minutes the gruel becomes thin from the conversion of the starch. When this point is reached the food is ready for use. The only precaution to be observed in the process is to make sure that the gruel is at least sufficiently cool to be borne in the mouth before the malt-infusion is added. It is not of the least consequence if the temperature be below this point, for the transformation goes on just as well when the gruel is cold as when it is warm; whereas too high a temperature endangers the activity of the ferment, which is rendered inert at and above  $157^{\circ}$  F. The product of the action of malt on starch is not cane-sugar nor grape-sugar, but maltose,<sup>2</sup>

<sup>1</sup> Efforts have been made to evade these difficulties but without much success, and some of the so-called improved methods are a good deal worse than the original.

<sup>2</sup> According to the observations of Brown and Hesse, 100 parts of starch are transformed by malt-infusion; when the reaction has reached its ultimate terms, into eighty parts of maltose and twenty parts of dextrine. (*Journ. Chem. Soc.* Sept. 1879.) The products of the action of salivary and pancreatic diastase on starch are, according to Musculus and v. Mering, absolutely identical with those of malt-diastase. (*Maly's Jahresbericht* for 1878, p. 49.)

and maltose has very little sweetening power. This is the reason why gruel thus digested suffers little change of taste, so little, indeed, that the addition of it to milk or broth produces scarcely any appreciable alteration of flavour.

Malt-extracts are less suited than malt-infusion for the pre-digestion of farinaceous aliments. Malt-extracts have a somewhat strong sweetening power, and they communicate a dingy brown colour to the food; whereas the infusion adds neither adventitious taste nor colour. Malt-infusion has also an enormous advantage in point of price. Malt-extracts cost three shillings a pound—the infusion can be made for three farthings a pound. The trials I have made, in actual practice, of food thus concocted, have been highly satisfactory.

I cannot take leave of this subject without adverting to the extraordinary power of extract of pancreas (liquor pancreaticus) as a diastatic agent. In this respect it far transcends any malt-extract. A sample, made by infusing one part of fresh pancreas with seven parts of water, was found, on trial, to possess fully twenty times the diastatic power of the above described standard malt-infusion. Pancreatic extract must therefore be considered as taking the first rank among the available artificial aids to the digestion of starch. It may be administered for that purpose exactly in the same way as the malt-infusion, but in reduced doses. As, however, extract of pancreas has other and probably more important uses as an artificial aid to the digestion of proteid substances, I will content myself here with this brief allusion, and refer the reader who wishes for further information to a paper on digestive ferments published by the writer in the *British Medical Journal* for 1st and 8th of last November.

AN ABSTRACT OF AN EXPERIMENTAL RESEARCH  
ON THE PHYSIOLOGICAL ACTIONS OF DRUGS  
ON THE SECRETION OF BILE.

BY WILLIAM RUTHERFORD, M.D., F.R.S.,

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(Continued from p. 338.)

RESINA PHYTOLACCÆ, or "PHYTOLACCIN," is prepared from the root of the *Phytolacca decandra*, an American plant. In small doses the root is said to act as an alterative, and has been highly recommended in chronic rheumatism. In large doses it produces excessive vomiting and purging, with great prostration of strength, and sometimes with convulsions. The preparation employed by us was prepared, as above, by Keith and Co. The dose for a man is from one to three grains. The physiological actions of phytolaccin have not hitherto been investigated. We have proved it to be in the dog a powerful hepatic and mild intestinal stimulant. It seems to be eminently worthy of the attention of the physician.

RESINA SANGUINARIÆ, or "SANGUINARIN," is prepared from the *Sanguinaria canadensis*. According to Wood and Bache, Dr. Tully so long ago as 1830 found the *Sanguinaria* to be a decided cholagogue when given in small repeated doses, and Dr. Mothershead, of Indianapolis, speaks in the strongest terms of its efficacy as an excitant of the liver when given in alterative doses. The dose of the resin is from  $\frac{1}{4}$  to 1 grain as a hepatic alterative. Our experiments prove that in the dog it is a powerful

hepatic and a slight intestinal stimulant, and show that the statements of Tully and Mothershead ought not to be treated with indifference and neglect, as they appear to be, in practical medicine.

RESINA LEPTANDRÆ, or "LEPTANDRIN," is said to be a cholagogue and tonic, and is at present not unfrequently used in the case of children. The dose for a man is from  $\frac{1}{2}$  to 3 grains three or four times daily. Our experiments prove that in the dog it is a hepatic stimulant of moderate power and a feeble stimulant of the intestine. Its power on the liver is similar to that of rhubarb.

RHUBARB.—As rhubarb gives to the dejections an appearance similar to that due to an increased discharge of bile, it is not possible from observations on the human subject to arrive at a definite conclusion regarding its influence on the liver. In consequence of this, in the latest works on *Materia Medica*, its action on the liver is ignored. Our experiments, however, prove that in the dog it is a certain, though not a powerful, hepatic stimulant.

SENNA is a hepatic stimulant of very feeble power, so feeble indeed that its effect on the liver may be discarded.

COLCHICUM has been recommended by Garrod as a cholagogue in cases of gout, but its action on the liver has not hitherto been tested by direct experiment. We found it to be a very powerful hepatic as well as intestinal stimulant in the dog, but the doses employed by us were very large—60 grains of the extract. Two grains is the maximum dose for a man. This large dose was given in the case of colchicum, aloes, and one or two other substances, in our earliest experiments, when we were under the erroneous impression derived from Rohrig's experiments, that the dog requires very large doses of drugs.

ALOES in very large doses—60 grains of the extract of Socotrine aloes—powerfully stimulates the dog's liver. In two experiments it decidedly reddened the intestinal mucous membrane, but stimulated Lieberkuhn's glands to only a very slight extent. With regard to the action of aloes on man, Garrod states that "by some observers the bile is asserted to be increased in quantity." Our experiments render it likely that they have good grounds for their assertion.

SCAMMONY is in the dog a powerful intestinal, but a feeble hepatic stimulant.

COLOCYNTH and JALAP are well-known intestinal stimulants, but nothing is said in works on *Materia Medica* regarding their influence on the discharge of bile. Rohrig, however, investigated their action in the dog, and found that they excite the liver. He thought them so powerful that he placed them *next to croton oil* in importance. We have already pointed out the faultiness of Rohrig's method, and have shown that croton oil is scarcely worthy of being classed amongst cholagogues. It seemed therefore desirable that we should experiment with colocynth and jalap in order to have results comparable with our experiments on other substances. We found that colocynth is, in large doses, a powerful hepatic, as well as intestinal stimulant, and that jalap is only a moderately powerful hepatic, while it is a powerful intestinal stimulant.

TARAXACUM.—There exists a vague idea that taraxacum has some influence on the liver. It is stated in Garrod's *Materia Medica* that it is *supposed* "to modify and increase its secretion," but it is generally felt that its action is extremely doubtful. Our experiments show that in the dog it is but a very feeble stimulant of the liver, even when given in large doses. There was no purgative action.

IPECACUAN.—As is well known, ipecacuan is regarded as almost a specific remedy in certain cases of dysentery. It is stated that it gives rise to evacuations containing a large quantity of bile. The manner in which it does this is not definitely known, some maintaining that it permits of biliary discharge by relieving spasm of the bile-ducts. Our experiments, undertaken at the desire of Sir Robert Christison, prove beyond a doubt that this substance is a powerful stimulant of the liver of the dog. The doses given varied from 3 to 60 grains, and all affected the liver. There was an increased secretion of mucus in the intestine, but no secretion of intestinal juice. The increased biliary flow that followed ipecacuan could not in our experiments be ascribed to any relaxation of "spasm of the bile-ducts," for that no such thing existed was clearly shown by the free flow of the bile before the substance was given. Nor could it be owing to contraction of the gall-bladder, for the cystic duct

was clamped. Nor could it be ascribed to contraction of the bile-ducts, for the increased flow was far too prolonged to be attributable to any such cause. It is therefore certain that this substance has the power of stimulating the *secreting* apparatus of the liver. This being now proved as regards the dog, it can scarcely be doubted that the *modus operandi* is the same in man. The result of our experiments will therefore lead to new speculations regarding the pathology of dysentery, for *every step towards greater accuracy of knowledge regarding the modus operandi of any therapeutic agent is certainly calculated to advance our knowledge of the true nature of the pathological condition that is relieved or cured by it.*

DILUTE NITRO-HYDROCHLORIC ACID was first employed in hepatic disorder by Dr. Scott of Bombay, who used it largely in congestion of the liver. It was administered as a foot-bath, and also internally. Its effects, however, were by some held to be so doubtful, that its use appears to have been abandoned for a time. Annesley, Martin, and others—experienced in the diseases of India—have, however, supported the opinion held by Scott. Wood maintains, from his own observations, that it increases the flow of the bile. Our experiments prove that in the dog it is a hepatic stimulant of considerable power. We found no evidence of any stimulation of Lieberkuhn's glands.

SODIUM SULPHATE.—Works on therapeutics generally make no mention of any cholagogue action of this substance. In the fourth edition of Gamrod's *Materia Medica*, however, it is stated that, in addition to its action as a saline purgative, it "probably influences the biliary secretion." Our experiments prove that, in addition to being a powerful intestinal stimulant, it is also a moderately powerful hepatic stimulant in the dog. The positive character of this result is important, because it is well known that the waters of Carlsbad have a cholagogue action, and although they contain, in addition to sodium sulphate, sodium carbonate, sodium chloride, potassium sulphate, and small quantities of other substances, sodium sulphate is the principal salt, and to it the cholagogue action is doubtless chiefly due.

Sodium sulphate, however, has for a considerable time been, in practical medicine, almost entirely superseded by magnesium sulphate, on account of its more agreeable taste, but it must

in future be borne in mind that while sodium sulphate stimulates the liver, magnesium sulphate—as already stated—does not.

POTASSIUM SULPHATE is sometimes employed as a purgative agent, but no mention is made in the books of its having any action on the liver. Dr. Wade of Birmingham, however, informed us that he finds this substance a cholagogue in man, and at his request we tested its action on the liver of the dog. We found that in the dog it is a hepatic and intestinal stimulant of considerable power, but its action on the liver is not so certain as that on the intestinal glands, for while in three experiments it did not fail to stimulate the latter, its action on the liver was decided in only one case. This uncertainty of action—which is probably referable to its sparing solubility—must not be lost sight of.

SODIUM PHOSPHATE is described in the text-books as a mild saline purgative, nothing being said about its action as a cholagogue. Professor Stephenson of Aberdeen, however, has found it specially useful for children when there is a deficiency of bile in the discharges. Our experiments prove it to be a powerful hepatic and a moderately powerful intestinal stimulant in the dog.

AMMONIUM PHOSPHATE is employed in cases of chronic gout, and in urinary affections where uric acid calculi exist or threaten. Nothing has been hitherto known regarding its action on the liver, probably because it is not an intestinal stimulant; and, therefore, the increased secretion of bile—which it probably induces in man as it certainly does in the dog—has passed unobserved. In the dog at all events it is a powerful stimulant of the liver, but—as in man—it is not a stimulant of the intestine. Probably now that we have directed attention to the matter it will be found to be a stimulant of the human liver also.

SODIUM AND POTASSIUM TARTRATE is in the dog a feeble hepatic but a powerful intestinal stimulant.

SODIUM CHLORIDE is a very feeble hepatic stimulant in the dog, for 360 grains given in divided doses but slightly raised the secretion of bile, although its stimulating effect on the intestinal glands was unequivocal.

SODIUM BICARBONATE very slightly stimulates the liver, and only when given in very large (217 grains) doses.

POTASSIUM BICARBONATE slightly stimulates the liver of the dog when it is given in very large doses (201 grains). It may be safely assumed that when 10 or 15 grains of sodium or potassium bicarbonate are given to man his biliary secretion is not sensibly affected.

POTASSIUM IODIDE is sometimes given in hepatic affections in the hope that it may produce an alterative effect. On this account it seemed desirable to ascertain whether or not it affects the biliary secretion. In one experiment doses of 10, 20, and 30 grains,—in a second case 5, 10, 20, 30, and 40 grains were successively given, and the biliary secretion did not appear to be affected.

BENZOIC ACID AND ITS COMPOUNDS.—Benzoic acid is said to act as a stimulant of the system generally, and particularly of the kidneys, mucous membrane of the bladder, and bronchial glands. It is nowhere stated to be a cholagogue. Yet it is sometimes used empirically in hepatic affections. Tanner, in his *Practice of Medicine*, recommends ammonium benzoate in hepatic congestion with deficient urine, and benzoic acid in suppressed action of the liver and uræmia. Dr. Wade of Birmingham employs benzoic acid in cases of catarrh of the bile-ducts; and we owe to the deep interest which he has taken in this research the valuable suggestion that we should endeavour to furnish a rational theory for the use of this agent in hepatic affections, by ascertaining whether or not it has the power of stimulating the liver. For a man, the dose of benzoic acid is from 10 to 30 grains; that of benzoate of ammonia from 10 to 20 grains. Benzoate of soda has been employed by Socquet and Bonjean as a remedy for gout and rheumatism; but we have not been able to ascertain the dose given. Probably the dose of the sodium is similar to that of the ammonium salt. In one experiment 15 grains of benzoic acid were administered; but though the bile-secretion rose somewhat, the rise was trifling compared with that which followed the administration of 20 grains of sodium benzoate. In another experiment a very marked increase of bile-secretion was produced by 20 grains of ammonium benzoate. Both salts are powerful stimu-

lants of the liver, and do not stimulate the intestine of the dog. Now that we have proved this action of these substances on the liver of the dog, a similar action on the human liver will probably be found; and probably the reason why it has hitherto escaped the attention of the physician is, that these substances, being hepatic but not intestinal stimulants, the hypersecretion of bile induced by the doses given has not been revealed so as to attract attention. But probably, if a dose of sodium or ammonium benzoate were given at night, and a purely intestinal stimulant, such as magnesium sulphate, given in the morning, evidence would be found of an increased secretion of bile. These results, therefore, tend to furnish a rational theory for the employment of the benzoates in congestion and some other affections of the liver. In view of the above discovery, we would ask the practical physician to consider the propriety of testing the effect of the benzoates in dysentery, for while they, like ipecacuan, powerfully stimulate the liver, and not the intestinal glands, they, unlike ipecacuan, induce no sickness or depression, but on the contrary, are nerve stimulants. Both the sodium and ammonium salts should be tried. It may also be well to observe that it would be perhaps advisable to increase the administration of the benzoates in ordinary catarrh, for they stimulate the liver as well as the bronchial glands, and the action of the liver in a common cold generally becomes somewhat defective.

**SODIUM SALICYLATE.**—Scarcely anything is known regarding the physiological actions of salicylic acid. Bertagnini took in two days 100 grains in 4-grain doses, and felt nothing but ringing in the ears and some degree of deafness. He observed that the acid was excreted in the urine in the form of salicyluric acid. It is known that this is a conjugate of salicylic acid and glycin (just as hippuric acid is a conjugate of benzoic acid and glycin). The formula of benzoic acid is  $C_7H_6O_2$ ; that of salicylic acid  $C_7H_6O_3$ . Their near chemical alliance, and their similar behaviour towards glycin rendered it probable that salicylic acid, like benzoic acid, excites the hepatic cells. Experiment has amply proved the correctness of this surmise. Sodium salicylate is a very powerful hepatic stimulant in the dog. The doses given varied from 20 to 30 grains, and when placed in

the duodenum they never failed to excite the liver within half-an-hour. The certainty of the action of this substance on the liver led us to use it in many experiments as a sort of test of the excitability of the liver. We have given to a man 30 grains of sodium salicylate at night, and next morning a dose of magnesium sulphate—a purely intestinal stimulant,—and there seemed to be an increased discharge of bile. We commend this point to the attention of the practitioner.

SALTS OF MERCURY.—We made the remarkable discovery that while calomel does not excite the dog's liver, corrosive sublimate stimulates it powerfully. In two cases  $\frac{1}{3}$  of a grain of the salt produced this effect, but in another case a very remarkable secretion of bile followed the administration of  $\frac{1}{15}$  of a grain of corrosive sublimate and 1 grain of calomel. Experiments with the latter given alone induced us to refer the hepatic stimulation to the former; the corrosive sublimate was always placed in the duodenum. With regard to calomel, we proved the following:—(1) That calomel in doses of 10 grains, 5 grains, or 2 grains, several times repeated, when placed *without bile*, in the duodenum of a fasting dog, produces a purgative effect, varying with the dose; but so far from increasing the bile-secretion, usually diminishes it, just as happens when any other substance that is not a hepatic stimulant—*e.g.* magnesium sulphate—is administered. (2) That when calomel is *mixed with bile*, and then introduced into the duodenum, there is no difference in the result, even when the calomel is given in one grain doses several times repeated, and the chance of acting on the liver, previous to supervention of the depressing effect of purgation, thus allowed. (3) That if five grains of calomel be subjected at 100° Fahr. for *seventeen hours* to the action of dilute hydrochloric acid, of the same strength as that of the human gastric juice, not more than  $\frac{1}{35}$  grain of corrosive sublimate is produced. The last point had reference to this question,—Is it not possible that, when five grains of calomel are placed in the stomach, corrosive sublimate is produced from it in sufficient quantity to excite the liver, while the unchanged calomel excites the intestinal glands? We are not in a position to say how much mercuric chloride is produced when five grains of calomel are introduced into the human stomach. If  $\frac{1}{35}$  of a grain were

formed after a seventeen hours' maceration in dilute hydrochloric acid of the same dilution as that of the gastric juice, how much would be formed in seven or eight hours when taken at night on an empty stomach? and what would be the effect of that small quantity on the human liver? As regards the dog, however, fearing that the circumstance of the calomel having been injected into the duodenum and not into the stomach might have prejudiced the result, we injected five grains into the stomach, but the result was entirely negative. After death the calomel was found—apparently unchanged—enveloped in the gastric mucus; for the animal was fasting, and the saliva of the dog is peculiar in containing a large quantity of viscid mucin. But in the experiments of Kolliker and Müller, Scott, and Bennett's Committee, the calomel was given by the mouth in the usual way, and the animals had their usual diet. *Every opportunity was therefore afforded for a transformation of the calomel into mercuric chloride*—probably indeed a better opportunity than is afforded in the human subject, for the gastric juice of the dog is more acid than that of man, and yet we find that the action of the calomel, when placed in the stomach of the dog, was just the same as when introduced directly into the duodenum. We have proved that  $\frac{1}{20}$  grain corrosive sublimate with 1 grain of calomel when placed in the duodenum can powerfully stimulate the liver of the dog, but we find no reason for entertaining the idea that the amount of mercuric chloride produced by the gastric juice from 5 grains of calomel has any appreciable effect on the liver, for in one of the experiments of Bennett's Committee the amount of calomel placed in the stomach was 10 grains, and it occasioned no increased secretion of bile.<sup>1</sup>

But it may be said, although these facts render it impossible to entertain the idea that the action of calomel is due to the mercuric chloride produced from it by the gastric juice, is it not possible that the entire absence of bile from the intestine in the case of the experiments of BENNETT'S Committee interfered with the absorption of the drug, so that while it excited the

<sup>1</sup> The dose of calomel was ten grains given on three successive days. On the first it produced "slight" and on the other two days "decided" purgation, but on all the days the fluid and the solid bile was diminished.

intestinal glands with which it came directly in contact, it failed to excite the liver because it could not reach it? This objection cannot be entertained.—(1) Because our experiments prove that when calomel mixed with bile is placed in the duodenum it does not stimulate the liver. (2) In the experiments of BENNETT's Committee, although the calomel could not possibly encounter bile in the alimentary canal, *a part of it must have been absorbed*, because when given in small doses, frequently repeated, the animal speedily lost its appetite and became extremely unwell, although the doses were too small to produce purgative action.

The conclusion is inevitable, that while corrosive sublimate does—calomel does not—stimulate the liver of the dog, and that when calomel is placed in the stomach of the dog, there is—if the dose be sufficient—the characteristic action on the intestinal glands, but no excitement of the liver. There is therefore no evidence that a purgative dose of calomel, when acted on by the gastric juice, gives rise to mercuric chloride sufficient to exert any appreciable effect on the liver.

Seeing that in these observations we have submitted to direct experiment on the liver of the dog, every substance that has any reputation as a cholagogue in the case of man, and seeing we have found that, with the exception of calomel, they all increase the biliary secretion in the dog, it appears to us that the remarkable harmony between the vast majority of our results and those of clinical experience, entitles us to maintain that our experiments with calomel are not to be set aside by the clinical observer, merely because he is of the opinion that calomel in some way or other increases the discharge of bile in man. There has been on the part of one or two physicians—who in their lamentable ignorance and narrow-mindedness imagine that physiological pharmacology studied on a dog cannot help them to know the action of a drug on man—a tendency altogether to set aside the results of former experiments with calomel, because they do not harmonise with their previously entertained opinions. These physicians appear to imagine that they can end the discussion by simply saying “the liver of a dog is not that of a man.” That truism cannot be disputed, and we are perfectly willing to admit that it is possible that the human

liver may be more or less susceptible than the liver of the dog to the influence of various substances, but we maintain that up to this time there is *really no proven discord* between our results and those arrived at by observations on man.

*All our experiments have had reference to the secretion and not the expulsion of bile.* For the purpose of arriving at definite knowledge, we intentionally—in the manner described at the outset of these experiments—threw out of action the *bile-expelling* mechanism, in order that we might have to deal with the *bile-secreting* apparatus only. *We do not profess to have ascertained anything regarding the action of any drug on the bile-expelling mechanism.*

The clinical observer has supplied most valuable information regarding the power of various substances to increase the amount of bile in the dejections. He observes dejections of a clay colour, he gives five grains of calomel, and further observes that in some cases the dejections thereafter assume their natural appearance. He cannot be certain of the manner in which this result is brought about. It might be occasioned (1) by stimulation of the hepatic secreting apparatus; or (2) by stimulation of the muscular fibres of the gall-bladder and larger bile-ducts—to wit—the bile-expelling apparatus; or (3) by removing a catarrhal or congested state of the orifice of the common bile-duct, or of the general extent of the larger bile-ducts; or (4) by removing from the intestine substances which had been passing therefrom into the portal vein and depressing the action of the hepatic cells; or (5) by stimulating the intestinal glands, and thus producing drainage of the portal system, whereby the “loaded” liver might possibly be relieved. Yet, notwithstanding the inability of clinical observers to unravel this complicated web, and supply us with any definite statement, one of them,<sup>1</sup> has felt inclined to think the results arrived at by BENNETT’S Committee of no value, because they

<sup>1</sup> *Vide* Dr. Moxon, *Hunterian Oration*, 1877, *Medical Press and Circular*, March, 1877. In that remarkable “oration” Dr. Moxon, while adopting an unbecoming style of supercilious criticism of the experiments of Bennett’s Committee, showed his ignorance of their object, of the experimental method employed, and of the conclusions drawn. His ignorance of the subject was reprehensible enough in a Hunterian orator, but much more so in a *Lecturer on Materia Medica and Therapeutics* in such a school as Guy’s Hospital.

proved by direct experiment that calomel does not in the dog stimulate the hepatic *secreting apparatus*.

Seeing that calomel stimulates the intestinal glands in the dog as in man; seeing that mercury produces salivation, ulceration of gums, and other characteristic phenomena in the dog as in man, the obvious inference is that the reputed cholagogue action of calomel in the human subject is probably not owing to stimulation of the bile-secreting apparatus. And why should we, in the face of our experiments, believe the opposite until the clinical observer substitutes—for *vague conjecture*—definite proof of that opposite, by experimenting in a case of biliary fistula in the human subject, when it happens that no bile enters the intestine, and where the amount secreted may be measured by collecting it as it flows from the fistula.

Our experiments therefore *suggest* that the cholagogue action of calomel in the human subject is to be sought for, not in any supposed power of stimulating the bile-secreting mechanism, but in some one or more of the last *four* modes of action above indicated. Calomel undoubtedly excites the intestinal glands, and for anything we know there may be something peculiar in the nature of its action thereon. For anything we know, it may also have some special influence on the mucous glands and mucous membrane generally of the larger bile-ducts, whereby a catarrhal condition of these ducts may be relieved and the pent-up Bile be thus permitted to escape. There is evidently still abundant room for conjecture, but our experiments plainly narrow its range, and thus contribute to the attainment of definite knowledge. The practical physician would, however, do well to observe our discovery, that when a small dose of corrosive sublimate is combined with calomel, stimulation of the liver, as well as of the intestinal glands, is the result.<sup>1</sup>

CALABAR BEAN excites the liver, but not powerfully, unless given in very large doses,—four times the maximum dose for a man.

ATROPIA SULPHATE.—It is known that atropia causes purgation and diuresis in dogs. On the other hand, it paralyzes the chorda tympani and the secretory nerves of the sweat and milk glands, and thereby arrests their secretions. It therefore

<sup>1</sup> On the *modus operandi* of calomel *vide* Lauder Brunton on the "Action of Purgatives," *Practitioner*, vol. xii., p. 412.

seemed desirable to determine the influence of atropia on the liver. We found that it does not paralyse the hepatic cells, nor does it excite them. Whether or not it possesses the power of paralysing the hepatic secretory nerves is doubtful; but, seeing that it antagonises the effect of physostigma on the liver, and remembering the action of these substances on the nerves of the heart and salivary glands, the suspicion is entertainable that physostigma stimulates the hepatic cells through a nervous apparatus that is affected in an opposite sense—possibly paralysed—by atropia; while the hepatic cells, and perhaps some nervous mechanism like the motor ganglia of the heart in close relation to them, are unaffected by atropia. Atropia does not antagonise the effect of phytolaccin or of ammonium benzoate. It was not tried in other cases.

**MORPHIA.**—As morphia has the well-known power of arresting diarrhoea and of producing constipation, it was desirable to know whether this is to be ascribed to its effect on the intestine alone, or also to a power of diminishing the secretion of bile. Three grains of morphia acetate injected into the duodenum did not affect the biliary secretion, and did not apparently interfere with the stimulating effects of 20 grains of sodium salicylate given shortly afterwards.

**HYOSCYAMUS.**—As extract of hyoscyamus is often administered with cholagogue substances, it is important to know whether or not it diminishes the secretion of bile. The dose of this substance for a man is from 5 to 10 grains. Eight grains of extract of hyoscyamus triturated with water were twice injected into the duodenum; 16 grains being given in all. There was no fall in secretion, but on the contrary, a trifling rise after each dose. It did not appear to interfere with the effect of sodium salicylate afterwards given.

**ALCOHOL.**—It is a matter of common opinion that alcoholic drinks affect the action of the liver; but, whether their hepatic effects may be ascribed to the alcohol, ethers, or other substances they contain, no one has hitherto sought to determine. 13 cc. of absolute alcohol in one case, and 30 cc. in another, both diluted and introduced into the alimentary canal, did not produce any apparent effect on the biliary secretion. These experiments, however, furnish no evidence of what might be the

effects of the prolonged action of alcohol on the liver; and, in consideration of the great labour and length of this research, we could not undertake experiments designed to show the effects of various sorts of alcoholic drinks, or of the substances other than alcohol which they contain. Such research could scarcely be of great practical importance, for we already know that certain alcoholic drinks—such as ale, stout, &c.—tend to produce biliousness; and, by experiments on the human subject, we have ascertained that the condition, thus induced, may be cured by giving iridin or euonymin, substances which powerfully stimulate the liver. As far as they go, however, our experiments show that *pure alcohol* has, at all events, *no immediate* action on the liver of the dog.

JABORANDI is a very feeble hepatic stimulant.

TANNIC ACID does not affect the secretion of bile.

RESINA MENISPERMI is prepared from the root of the yellow parilla (*Menispermum canadense*), in the same manner as iridin. It is said to be alterative, tonic, laxative, diuretic, stimulant, and resolvent, and to be useful in hepatic torpor, indigestion, etc. The medium dose of Keith's menispermum is 2 grains. We found it to be in the dog a slight intestinal, but not a hepatic stimulant.

ACETATE OF LEAD.—The well-known astringent effect of lead acetate in cases of diarrhoea rendered it desirable to know whether or not it has the power of diminishing the secretion of bile. Röhrig experimented with acetate of lead, and found that 0.6 gramme (9.2 grains), dissolved in 4 ounces of warm water, and injected into the small intestine of a dog, diminished the secretion of bile. The erroneous nature of some of Röhrig's results, due to his imperfect mode of experiment, rendered necessary a re-investigation of the effects of lead acetate. We did not find 10 or even 30 grains of lead acetate produce the depressant effect which Röhrig had led us to anticipate. Fifty grains, however, had a distinctly depressant effect. But although it caused the liver to secrete very slowly, its effect was completely overcome by 20 grains of sodium salicylate, which produced a very rapid secretion of bile at so late a period as the ninth hour of the experiment. The obstinate constipation observed in cases of lead-poisoning may, to some extent, be owing to the depressant effect of lead on the liver; but it is

probably chiefly owing to a depressant action on the intestinal glands, for, in view of the astringent effect of a dose of from 1 to 4 grains in diarrhoea, it seems likely, from our experiments, that it affects the intestinal canal more than the liver. It is a remarkable fact that, of all the substances employed in this research, lead acetate is the only one which depresses the action of the liver without producing purgation. It seems to be a direct hepatic depressant. As previously explained, every purely intestinal purgative agent depresses hepatic action, in a manner which is probably, however, purely indirect.

EFFECT OF WATER AND BILE.—The injection of 100 cc. (1543 grains) of water into the duodenum gives rise to only a very trifling increase of bile-secretion. The injection of 3 cc. (46.2 grains) of bile into the duodenum does not affect bile-secretion. The injection of 6 cc. (92.4 grains), however, increases the secretion slightly. In consequence of the negative effect of 1 cc. or 2 cc. bile, we mixed such a quantity with all resinous matters previous to their introduction into the duodenum, with a view to promote their absorption; for we found that without the bile larger doses were required. The practical inference is that *in such cases of jaundice where no bile enters the intestine, doses of such resinous matters as iridin, euonymin, podophyllin, require to be larger than in the normal condition.*

GENERAL REFERENCE TO RESULTS.—It is evident from the foregoing that the whole question of the action of drugs on the liver is placed on a new footing. We show—1. That there are substances which depress the secretion of bile. To this group belong purely intestinal stimulants, which cause a copious secretion from the intestinal glands, *e.g.*, sulphate of magnesia, sulphate of manganese, castor oil, gamboge, calomel, ammonium chloride, &c. and acetate of lead, which seems to exert a directly depressant influence on the liver. 2. That there are substances which stimulate the liver, and either do not stimulate the intestinal glands at all, or only to a trifling extent. To this group belong ipecacuan, sodium benzoate, ammonium benzoate, sodium salicylate, ammonium phosphate, and dilute nitrohydrochloric acid. 3. That there are many substances which excite both the liver and the intestinal glands. To this group belong iridin, euonymin, podophyllin, phytolaccin, baptisin, hydrastin

juglandin, leptandrin, sanguinarin, colchicum, rhubarb, aloes, colocynth, jalap, sodium phosphate, sodium sulphate, potassium sulphate, Rochelle salt, and corrosive sublimate. The relative effects which they produce on the liver and intestine, and their influence on other parts of the organism, vary much with the different drugs, so that the physician has a long list from which to select substances suitable for affecting the liver in those who are simply bilious, or who also suffer from gouty, rheumatic, dysenteric, or other conditions. It is to be borne in mind that nearly all our experiments have been confined to the dog, and we leave to the practitioners of medicine the task of testing the actions of many of the above substances on man.

MODE OF ACTION OF HEPATIC STIMULANTS.—Although we have definitely proved that a large number of substances stimulate the liver to secrete more bile, we do not profess to have absolutely shown in what manner they do this. It may be asked :—

1. Do they excite the mucous membrane of the duodenum or other part of the small intestine, and thereby induce reflex excitement of the liver? One would be readily disposed to entertain this idea from the fact that stimulation of the oral mucous membrane so readily induces secretion in the salivary glands; yet we are obliged to reject the idea that this likewise holds true of the liver, because such substances as gamboge and magnesium sulphate powerfully irritate the intestinal mucous membrane, while they do not in the least increase the secretion of bile. On the other hand, such substances as ipecacuan, sodium benzoate, and ammonium benzoate powerfully excite the liver without inducing any notable excitement of the intestine.

2. Do these substances stimulate the hepatic cells by merely increasing the stream of blood through the liver? Whatever be the state of the hepatic vessels during increase of the biliary secretion, it is quite certain that increased secretion of bile does not necessarily follow dilatation of the intestinal capillaries; the effect of which, if it be not carried to excess, may with reason be supposed to increase the stream of blood through the portal vein, and thence through the liver; for example, castor-oil greatly dilates the intestinal capillaries, yet the bile secretion does not rise in the least.

3. We therefore believe that the effect of hepatic stimulants is to be assigned to a direct action of their molecules upon the hepatic cells or their nerves. The effect of physostigma and atropia rather points to an action on the latter—in their instance, at all events—as has been already indicated. But we do not think it advisable at present to pursue this difficult subject, which, as far as we can see, is of little importance compared with knowing what does and what does not stimulate the liver.

It is particularly to be observed that all our experiments concern the influence of substances on the *bile-secreting* mechanism. The nature of our method has forbidden any observations on the action of drugs on the *bile-expelling* mechanism. Seeing that the acid chyme, by irritating the duodenal mucous membrane, effects a reflex expulsion of bile, it may be that many substances which stimulate the duodenum have a similar effect. Yet we cannot but think that to bring about an *expulsion* of bile by muscular contraction of the gall-bladder and bile-ducts is, in all probability, a small thing when compared with increasing the secretion of bile. One might expect that such powerful intestinal irritants as magnesium sulphate and gamboge would be likely to bring about a reflex expulsion of bile; yet no one has attributed any cholagogue power to these. But, without attempting to reason out a question that can only be determined by experiment, we would merely add that we leave the investigation of the action of drugs on the *bile-expelling* mechanism to those who care to enter upon such an inquiry. We are satisfied to have shown that every substance supposed to be a cholagogue has, with the exception of calomel and sulphate of manganese, the power of exciting the *bile-secreting* mechanism; and, as our estimate of their powers, from an observation of the *bile-secretion* only, so closely agrees with observations on the human subject, where actions on the bile-secreting and on the bile-expelling mechanisms cannot be distinguished from one another, we cannot but infer that surely their actions on the human subject must be chiefly on the bile-secreting mechanism.

The term cholagogue is of necessity a vague one, and is applicable to any substance that increases the biliary flow, whether by augmenting bile-secretion or by exciting contraction in the

walls of the bile-passages. We have, therefore, applied the more definite term *hepatic stimulant* to those substances which we have proved to increase the *secretion* of bile.

CONCLUDING OBSERVATIONS.—In the introduction we pointed out what had been ascertained regarding the actions of drugs on the secretion of bile by our predecessors. We showed that, for want of a proper method of experiment, the definite knowledge arrived at was very meagre, and to some extent erroneous; and, if the statements in that introduction be compared with the results above detailed, some idea may be formed of the extent of our labour. We claim that, by means of a novel and precise method of investigation, we have been the first to place the whole subject of the physiological actions of drugs on the bile-secreting function of the liver upon a sound footing, and thus to lay a real foundation for the rational—that is, scientific—treatment of many diseased conditions of this important organ: and it is gratifying to know that, in consequence of this research, many physicians have been led to use new remedies to which we have specially directed attention. We have indeed, by our experiments, occasioned pain to a number of dogs; but considering that our discoveries are calculated to relieve much suffering, not only of men, but also of dogs, for all time to come, we believe that we have spared infinitely more suffering in the future than we have occasioned in the present.

I have to tender my cordial thanks to my former pupils, M. Vignal and William J. Dodds, M.B., D.Sc., for their valuable assistance in the performance of the excessively tedious experiments, each one of which lasted from six to nine hours. I have very cordially to thank the Scientific Grants Committee of the British Medical Association for having voted upward of £200 from the funds of the Association to defray the very heavy expenses incurred for the materials of the research, and for their energetic and powerful support at a time when the clamour of blind ignorance and silly prejudice seriously menaced and almost arrested the progress of the work.

I have intentionally omitted nearly all references from this abstract, and many other points which will be found fully given in the detailed memoir.

## QUININE AS AN ECBOLIC.

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IN the *Practitioner* for April and July, 1877, there is in each a short article on the ecboic property of quinine, and as this property seems to manifest itself more often than is generally supposed, I think it will not be out of place to add my experience to that of others. In October, 1876, I was called in to see the wife of a coffee-planter who was suffering from malarial fever (of an intermittent type) contracted the previous year at Peshawur. I was aware of the fact of her being in her third month of pregnancy, but did not in consequence hesitate to prescribe quinine, as the attack of fever was of a somewhat severe nature. She remained free from fever for some time afterwards, but on her return to the estate she experienced another attack and at once treated herself with quinine (but in what dose I cannot say), the result of which was that after a few doses symptoms of labour set in and she aborted. Since then I have met with several cases of malarial fever occurring in pregnant women in different stages of gestation, and have, as before, prescribed quinine in doses varying from five to ten grains daily, without witnessing any baneful results, and I began to think that the previous case was due to some peculiar idiosyncrasy. A few days ago, however, I was called in to see a young native lady æt. 18, suffering from an attack of malarial fever, and who was in her eighth month of pregnancy.

As it was her first pregnancy, and not knowing how she would stand the quinine. I prescribed the following:—

R Quiniæ Sulph., gr. v.  
 Acid Tartaric, gr. iv.  
 Tinct. opii, ℥x.  
 Aquam ad ʒi. S. d.

The opium was given in the hopes of counteracting any effect the quinine might have upon the uterus. I gave strict injunctions that she was to have only one dose that night, and that the following morning they were to let me know how she was and I would, if advisable, give her a second dose. About noon, the following day her father wrote up to say that during his absence his wife (who is not able to read English) had given her daughter two doses, so that within twelve hours she had taken fifteen grains of quinine, and that she had, at the time of his writing, suspicious symptoms of labour coming on. It occurred to me that very probably she had been told by some one that quinine had that effect in some cases, and the symptoms were only imaginary. This, however, they did not turn out to be, as early the same evening she gave birth to a living female child. (Owing to caste prejudices I was not called in to see her afterwards, but I have since heard that she is doing well.) This last case is extremely clear, as I am unable to ascribe the onset of labour to any other cause than that of quinine, as when I saw her the night previously she had no symptoms of labour whatever, and had my instructions been carried out, I am of the opinion that this accident would not have occurred, as it was not until the second and third doses had been administered that the symptoms of labour became manifest.

In countries where malarial fever does not prevail, this ecboic property possessed by quinine does not much signify, but where malarial fever constitutes one of the most frequent diseases, and one which, if not checked early, will, *per se*, induce labour, and whereas quinine is the only efficient remedy, this property becomes of great signification, and I must confess that in future I shall feel inclined to give arsenic a fair trial in cases of malarial fever complicated with pregnancy, before resorting to the administration of quinine.

## ON THE TREATMENT OF THE NIGHT-SWEATING OF PHTHISIS.

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(Continued from p. 246.)

### X.—JABORANDI AND PILOCARPINE.

FOR some months past I have been making observations on the influence of jaborandi and its alkaloid, pilocarpine, on different forms of pathological sweating, and more especially on the night-sweats of phthisis. The treatment is not new. Dr. Ringer and Mr. Bury in the *Practitioner* for December, 1876, recorded two cases of unilateral sweating treated by pilocarpine. Prof. Pancoast, in a clinical lecture recently delivered at the Pennsylvania Hospital, recommended the addition of jaborandi to atropia when employed for checking the sweating of phthisis. Pilocarpine has also been used for night-sweating at the Philadelphia Hospital, by Dr. Charles H. Weikel.

I have taken notes of thirty-three cases of sweating treated with either pilocarpine or jaborandi. With the exception of three they were all cases of phthisis. They were out-patients, and were seen some once, and some twice, a week. Many of them had been attending at the hospital for many months, and some for nearly two years. They were not picked in any way, but were taken in the order in which they came.

I have thought it best to present the cases in a tabular form. Table I gives the pilocarpine cases, and Table II. the jaborandi

cases. Some patients took both pilocarpine and jaborandi—at different times—and they are placed under the preparation first taken.

By reference to the pilocarpine table it will be seen that of the seventeen cases nine were men, six women, and two children. The ages of the men ranged from 19 to 43, and of the women from 20 to 34. These were all cases of phthisis, and all stages of the disease were represented, some being exceptionally bad cases. As a rule I gave the nitrate of pilocarpine, but in some cases I have used the hydrochlorate, and both appear to act equally well. I have always given the drug by mouth and never hypodermically. The dose employed was, with a few exceptions, a twentieth of a grain. In my earlier observations the salt was given simply in solution in water, but now I have it made up into pills with a little sugar of milk. In some cases I have given the drug three times a day, in others four times a day, and sometimes only at bed-time. When the sweating is purely night-sweating, a dose at bed-time seems to do as much good as if it were given three times a day. It is a good plan when the sweating at night is very severe, to give a pill three times during the night; or should the patient be fortunate enough to sleep well, to give three pills before going to bed, allowing an interval of half an hour between each. As a rule but little improvement is noticed on the first night, but on the second and third nights the sweating is much less, and by the end of the week has completely disappeared, or is so slight that it gives no inconvenience. Pilocarpine acts somewhat slowly, but it is very efficacious. It does not over-dry the skin, but leaves it comfortably moist, and in this respect it resembles picrotoxine. The solution is tasteless, an advantage in the case of children. One woman at first refused to take the medicine, saying that it looked just like water; but the difficulty was soon overcome. After the sweating has been checked by pilocarpine there is, as a rule, no return for many weeks. In four cases I gave half-grain doses of the pilocarpine on alternate nights at bed-time. These large doses prove very successful in checking the pathological sweating, but they give the patient some inconvenience, and have no advantage over the ordinary medicinal dose. It will be seen that in every case the drug did some good,

and in most cases it was a great success. The first case, curiously enough, was the least successful.

In Table II. details are given of the sixteen cases treated with *jaborandi*. Of these, two were rickets, one presented the physical signs of emphysema and bronchitis, whilst the rest were phthisis. Of the thirteen phthisis cases six were men, five were women, and two were children. The ages of the six men ranged from 19 to 45; and of the five women from 18 to 43. The dose of *jaborandi* employed was not the same in each case. In some instances a drachm of the tincture was ordered in an eight-ounce bottle of water, and of this a teaspoonful was given every three hours; in other cases, fifteen to twenty minims were given every four hours. I think the larger dose is to be preferred. In two cases, twenty minims every four hours, produced the physiological action of the drug, showing that too much had been given. In the two cases of rickets the *jaborandi* acted well in checking the sweating about the head.

In a case of perspirations accompanied by flushings, the *jaborandi* checked the former, but left the latter untouched. The patient, C. J., aged 42, was a stout woman with a red face. She had had a cough for years, more or less, all the year round. She expectorated a great deal, and it was not very easy to get up. There were often streaks of blood in the phlegm, but there was never any regular hæmoptysis. She had not lost flesh, but seemed rather to be gaining. She had been subject to sweatings night and day, off and on for six or eight years—generally more in the summer than in the winter. The perspirations were very severe, and she would have to change her things often two or three times in the day. She would awake with them in the middle of the night, her hair and all quite wet. In the day-time it would come on with flushes; first she flushed, then felt hot all over, and then came out in a great sweat; even when sitting still it would ooze out of her. These attacks came on at all times, and she did not know at all what brought them on. They had been getting worse during the last two years. She was regular every three weeks. On examining the chest there was found prolonged expiration all over, but nothing more. She was ordered a drachm of tincture of *jaborandi* in eight ounces of water—a teaspoonful to be taken every three hours.

The first day she was no better; the second day the perspirations were not nearly so bad, but the flushes were no better. The third day she was quite free from sweating at night, and had very little in the day-time. The medicine was continued for a week longer, and she then reported that she had quite got rid of the perspirations, but the flushes were no better.

In two other cases of flushing not accompanied by sweating, occurring in women about the age of 45, five-minim doses of tincture of jaborandi, every four hours, gave speedy relief.

I found jaborandi useful in a curious case of unilateral sweating. The patient is a woman aged 39. For the last three weeks she has suffered from swimming in the head. The attacks come on three or four times a day, generally towards the evening, and last a minute or two. They come on without warning, and usually when she is at work; rarely when she is sitting still. Not long ago she fell down in one. They are always accompanied by perspiration about the head, confined strictly to the right side. She never has an attack without this perspiration. It is not fancy, for it is enough to make her wet and run off her. She has no perspirations at night, and is not ill in any other way. She does not know what brought it on. She has no pains in her head. She is regular, but the menses are excessive, and she mis-carried two months ago. She was ordered ten minims of tincture of jaborandi in half an ounce of water three times a day. Four days later she reported that the perspirations were much better, but that the swimming in the head was as bad as ever. The perspiration, she said, no longer ran off her as it did. The dose was then increased to twenty minims, and four days later the perspirations had entirely ceased, but the giddiness was no better.

I gave jaborandi to a strong healthy man, aged 49, a stoker at the gasworks at King's Cross. He had to carry sacks of coke to the furnace, and perspired most profusely during his work. He had been a stoker of some kind almost all his life. At one time he was in the navy, and was afterwards a blockade-runner in the American war. The jaborandi had not the slightest effect on the sweating, and it remained as bad as ever.

In giving jaborandi to patients with phthisis, I was struck with the frequency with which they said it "did the cough

good," "brought up the phlegm," and "eased the breathing." It is undoubtedly a useful expectorant. I have given it in many cases of winter cough, and with a fair amount of success. It is a good plan to give a full dose one or two nights at bedtime, and then a smaller dose three or four times a day. Some years ago I assisted Dr. Ringer in some observations on the use of jaborandi spray in winter cough, and on the whole good results were obtained, although ipecacuanha wine is much better. It is best to use a Siegle's spray apparatus, and to dilute the tincture of jaborandi with at least an equal quantity of water. In a case of asthma in which I recently tried it, the dyspnoea was decidedly increased.

In the subjoined Tables the following Abbreviations are employed:—

C. = Cough; L. F. = Lost Flesh; Rt. = Right Lung; Lt. = Left Lung; Crep. = Crepitation; Vom. = Vomica; Br. Br. = Bronchial Breathing; S-s.f. = Supra-scapular Fossa; Hæ. = Blood.

TABLE I.—Cases of Phthisis treated with *Pilocarpine*.

Name.	Sex.	Age.	Symptoms.	Physical signs.	● Night Sweats.—Duration and Severity of.	Treatment.	Result.	Remarks.
J. B.	M.	31	C. 7 months, used to keep him awake at night, now wakes him up. E. L. F. very much. T. (at 4 p.m.) 103.6.	Rt. vom. Lk. vom.	Abough three months; not every night till last three weeks; very severe; can scoop it off him; sheets wet.	Pliocarp. Nit. gr. ʒi. Aft. ʒss. t. d. s. 4 days.	Better on second night, now almost gone; did most good about the body and legs. Medicine discontinued. Perspiration returned next night, just as bad as at first.	
could	..	..	..	..	One week. As bad as at first.	Rep. 7 days.	Has come no good this time, sweating alone at 12, 3.30 a.m., and 7 a.m. Takes his last dose at 10 p.m.	Pil pulv. Ipecac. stopped gr. ʒi. on 11th. Sweating at once. "Put fresh life into him."
could.	..	..	..	..	..	To take all three doses at night 7 days.	Decidedly better, though has not stopped it.	
M. L.	F.	25	C. with expect.	Rt. nil. Lk. vom.	Six months, or longer, every night as so on as she goes to bed; wets night gown all over.	Pliocarp. Nit. gr. ʒi. t. d. s. 7 days. Rep. 7 days.	No better till 5th night. Much better since. Now nearly gone.	C. much better, brings up phlegm; not at all in the first day.
could.	..	..	..	..	..	..	No sweating at all. "Quite cured."	"Better in every way."
E. F.	F.	20	C. ex. Great L. F.	Rt. nil. Lk. crep. at apex	Fortnight, every night; comes on about 3.0 a.m.; will wet flannels and night-gown.	Pliocarp. Nit. gr. ʒi. Quarterly 7 days.	Began to improve the first night. Not nearly so much as there was. Is sure it has done her good, though has not gone yet.	Objected to medicine because it was tasteless.
could.	..	..	..	..	..	Rep. 4 days. Pliocarp. Nit. gr. ʒi. h. n. Rep. mist 7 days.	Brought made her sweat very much, but has been better since.—much.	C. much easier, phlegm comes, no without trouble; is doing her good.
could.	..	..	..	..	..	..	Sweating quite gone. Remained under observation for five weeks after medicine discontinued, but no return.	
● T.	F	20	C. with expect.	Rt crep. Lk. nil.	Very bad last ten days, day as well as night; cough, very much after meals and then perspires freely.	Pliocarp. Nit. gr. ʒi. Quarterly 7 days.	No sweating. Much better. Came to attend.	
E. B.	F.	22	C. 5 weeks, result of getting wet through; at the streaks at times. L. F. a stone in 5 weeks. No fam. hist.	Rt. nil. Lk. vom. at apex.	I five weeks, every night; comes on before she goes to sleep all over. faint, feet and all; hair sometimes as wet as if she had washed her head in water.	Pliocarp. Nit. gr. ʒi. t. d. s. 7 days.	No improvement first night; very little; if any, second night; fourth night much better, not nearly so wet. Very little now, not enough to give her any trouble.	C. much better, though still bad; does not weigh so old n.

TABLE I.—continued.

No.	Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
6	A. V.	F.	28	C. 4 months, with expect. L. F.; Dyspn.	Rt. coarse crep.	Four or five weeks at night, as soon as she gets into bed; makes things very wet all over body; weak and wet in the morning, often in day as well.	Pilocarp. Nit. gr. $\frac{1}{10}$ , t. d. s. 7 days. Rep. quarter dose 7 days.	Better after one or two doses. Much better now. Very little.	C. no better, an breath very short
	contd.	"	"	"	"	"	Rep. i. d. 4 days.	Ceased completely, but returned in ten days, after medicine discontinued.	
	contd.	"	"	"	"	Four nights this time; very bad again, as bad as used to be.	Rep. i. d. 4 days.	Very much better. Nearly gone. A week later she said she was quite free from perspiration, and there has been none for the last three weeks.	
7	J. H.	F.	84	"	Rt. deficient movement, and higher pitched, but no crep.	Three months, every night, never misses; wringing wet, hair and all; very weak from the sweating.	Pilocarp. Nit. gr. $\frac{1}{10}$ , t. d. s. 4 days. Rep. quarter dose	No better first night; better second night; much better since.	
	contd.	"	"	"	"	"	"	Only a very little sweating now. Medicine was discontinued, and for the last four weeks there has been no sweating.	
8	J. H. P.	M.	19	C. 19 months, with expect. has, twice, about a teaspoonful.	Lt. deficient movement, higher pitched, little crep. at apex.	Four months, every night, does not miss at all; goes to bed at 10.30, and it comes on in half an hour, not very severe, only on body; things are wet through in the morning.	Pilocarp. Nit. gr. $\frac{1}{10}$ , t. d. s. 7 days.	First night sweating was better; second night much better; third night none at all, and none since.	C. no better at all, but no easier.
9	W. D.	M.	38	C. with expect.	40 l.	Four nights, very severe, as if some one had emptied a pail of water over him; in the day as well on the least exertion.	Pilocarp. Nit. gr. $\frac{1}{10}$ , t. d. s. 7 days. alt. noct. 3 nights	Better, but no improvement till fifth night.	In a previous attack of night sweat took picrotoxin with much benefit. Says this medicine is not so good as the sweating as the old one.
	contd.	"	"	"	"	"	"	First night, took dose, and sweated very much all night. Second night, no medicine, and sweated much as usual. Third night, took a dose, and sweated much as on the first night. Fourth night, sweating better. Fifth night, took a dose, and sweated again very much. Since then has had no sweating. The medicine was discontinued, and for five weeks there has been no sweating.	

TABLE I.—continued.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
W. H.	M.	42	C. 2 years very bad; ex. thick, yellow, me. p. 2 st. 16 months.	Rt. coarse crep. Lt. cavi. but very little secretion.	One year, off and on; every night this week; could wipe it off him all over the body.	Pil Pilo, Nit. gr. $\frac{1}{2}$ o. u. $\frac{1}{2}$ vii.	First night, no better; second night, some improvement; third night, better still, and since then hardly any; has practically stopped. The medicine was discontinued, and for three weeks there was no return, except for a night or two, when there was a very little.	
W. H.	M.	38	C. ex. M. a. $\phi$ .	Rt. dull, high-pitched, with crep. at apex.	Five or six days, never before; almost in a pool of water when in bed.	Pil Pilo, Nit. gr. $\frac{1}{2}$ T. o. $\frac{1}{2}$ vii. Rep. 7 days.	Began to get better on second or third night, and hardly any at all since.	
contd.	"	"	"	"	"	"	Quite gone. Medicine discontinued, and a week later no return.	
W. W.	M.	8	"	Rt. consolidation from apex to base.	One week, every night; sheet quite wet in morning; also perspires in day.	Pilocarp. Nit. gr. $\frac{1}{2}$ t. d. s. 7 days.	Less in a night or two; nothing to speak of now. Medicine discontinued, and no return in a week.	In a previous attack Pilocarpine had done him good.
J. M.	M.	25	C. 2 or 3 years, with expect., hæm. profuse at times; L. P.	Rt. poor note at apex and br. br. Lt. deficient movement at apex; bad note br. br. little scattered creaking.	Is a comedlan; perspires at night, but chiefly in evening when perspiring from 8 to 10 and then gets wet through.	Pil Pilo, Nit. gr. $\frac{1}{2}$ o. u. 7 days.	Perspirations not quite so much, but improvement very slight.	
contd.	"	"	"	"	"	Pil Pilocarp. Hydrochlor. gr. $\frac{1}{2}$ o. u. 7 days.	Very little improvement.	Pilocarpine had previously done him good.
contd.	"	"	"	"	"	Rep. t. d. 1 pil at 6.30 p. m., 1 at 7.0, 1 at 7.30 or 8.0.	Sweating completely stopped by second night.	
C. B.	M.	8	C. 2 or 3 years, with expect. lately, very thin.	Rt. br. br. in infra clax. with cooling in s. sf.	Two years, off and on, but for last fortnight has been constant, every night; comes on almost as soon as he goes to sleep, enough to damp sheets. Goes to bed about 8.	Pilocarp. Nit. gr. $\frac{1}{2}$ A. o. $\frac{1}{2}$ t. d. s. 4 days.	Much better, but not gone.	

TABLE I.—continued.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
C. B.	M.	8	cold, ...	" " "	" " " " " "	To take medicine at 5.30 6.30, and 7.30 p.m. 4 days.	Still further improvement; hardly at all now.	Mother says medicine has cured his cough.
A. T.	M.	43	C. 12 months; $\infty$ . great deal thick, yellow; L. F. 3 or 4 months, engaged in demolishing old houses.	Poor note both sides, no localized dulness, no distinct crep., though probably distant crep. Dust $\phi\theta$ .	Many weeks, every night; comes on about 12 o'clock; night wring hair; nasty sour sort of sweat.	Pilocarp. Nit. gr. $\frac{1}{2}$ . alt. noct. 3 doses	Made him sweat very much the nights he took it. After three doses sweating ceased, and now hardly any at all. Medicine was discontinued, and there has been no sweating for the last four weeks.	Patient attributes the excessive sweating on the three nights to the draught.
E. G.	M.	20	C. with expect. Loss of strength.	Rt. deficient movement, slightly higher pitched, but no crep.	Eight or ten days, very bad; kept him awake every night.	Pilocarp. Nit. gr. $\frac{1}{2}$ . alt. noct. 3 doses	First night took his draught, made him retch and vomit; perspired profusely; awake all night, very uncomfortable; very little salivation. Second night, sweating about the normal. Third night, took his dose, sweating much same as first night. Fourth night, as second night. Fifth night, took dose and sweating and retching very bad. Sixth night, about as usual. Seventh night, much better, hardly any at all; good night's rest, better than for weeks. Medicine was discontinued, and for last six weeks has been no sweating.	
J. C.	M.	28	C. 1 month, with expect. L. F. engaged in 1 st. in 2 month.	No physical signs were detected.	One week, every night; comes on about 12, lasts one-and-a-half hours, and makes flannels damp.	Pilocarp. Nit. gr. $\frac{1}{2}$ . o. n. 7 days.	Medicine made him sweat frightfully every night, lasting two hours or more; water came running out of his mouth. Cured his night sweating.	

TABLE II.—Cases of Sweating treated with *Jaborandi*.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
T. G.	M.	45	C. 7 months, with expect. hae., and cough, three months ago. L. F. seven months. M. 60.	Rt. coarse crep. all over front. Lt. nil.	Over two months; when goes to sleep, awakes all sopping, just if he had a half of water thrown over him. Things quite drenched. Also sweats in daytime.	Tinct. Jab. $\mathfrak{z}$ j. Aq. $\mathfrak{z}$ iii $\mathfrak{z}$ j. $\mathfrak{z}$ ss. horis. 3 days.	First night as bad as ever; no improvement. Second night, not so much; great improvement. Third night, none at all, quite dry. Medicine discontinued, and no return till nineteenth day.	
contd.	..	..	..	..	Two nights again; very bad.	Rep. 7 days.	Did not ease sweating at all.	
contd.	..	..	..	..	..	Tinct. Jab. $\mathfrak{M}\mathfrak{x}\mathfrak{v}$ . Aq. $\mathfrak{z}$ ss. o. u. 7 days.	Better at night, but sweating in daytime just as bad.	Picrotoxin was then tried, and at once gave relief. Did him much more good than the other medicine.
K. B.	F.	18	C. with expect.	Coarse crep. all over both sides	Four-and-a-half months every night; comes on between 11 and 12; makes things quite wet, on chest and back especially.	Tinct. Jab. $\mathfrak{z}$ j. Aq. $\mathfrak{z}$ iii Dose $\mathfrak{z}$ j. 4 days.	First night took $\mathfrak{z}$ j. and no better; second night took $\mathfrak{z}$ ij, little better; third day took $\mathfrak{z}$ j, three times, much better.	In this case picrotoxin had previously failed.
contd.	..	..	..	..	..	Rep $\mathfrak{z}$ j t. d. s. 7 days.	No better.	
contd.	..	..	..	..	..	Tinct. Jab. $\mathfrak{M}\mathfrak{x}\mathfrak{v}$ . Aq. $\mathfrak{z}$ ss. o u. 4 nights.	Great deal of improvement; not quite stopped, but very nearly.	
contd.	..	..	..	..	..	Rep. amb. 4 days.	Very much better, nothing to complain of now.	
T. N.	F.	32	C, ex; L. F.	Harsh breathing at both apices.	Last six weeks very much every night; goes to bed at 10, awakes at 2 or 3, quite wet; makes her so weak.	Tinct. Jab. $\mathfrak{z}$ j. Aq. ad. $\mathfrak{z}$ iii $\mathfrak{z}$ j. quadr die.	First night, after two doses, no better. Second night, better, and gradually less every night. Still some, but not nearly so much, used to be as if lying in water, now not enough to make her uncomfortable.	
contd.	..	..	..	..	..	Aq. Camph. 7 days.	Has increased during last week, but not very much.	

TABLE II.—continued.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of				Treatment.	Result.	Remarks.
T. N.	F.	32	contd. ...	... ..	... ..	... ..	... ..	... ..	Tinct. Iab. ʒss. Aq. ad. ʒviii. Al. quater die 4 days.	Much better improvement first night, and still more the second.	
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	No medicine 14 days.	Perspirations worse again—much.	
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Rep. Iab. 7 days.	No better.	
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Pilocarp. Nit. Aq. ʒss. t. d. s. 7 days.	Better first night; almost gone now.	
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Aq. Camph 14 days.	Perspirations returned in a week.	During a portion of this time patient suffered from a large abscess in the lumbar region.
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Rep. Pilocarp. t. d. s.	Much better; do not trouble her at all now.	
J. F.	M.	19	C. 7 months, with expect. L. F. very great. dyspn. on exertion.	Rt. consolidation.	Three weeks very severe; awakes and finds herself wet, flannels and linen shirt wet, and also bed clothes; perspirations all over body, but not on head, from chest downwards. Much exhausted in morning; no sweating in day.	... ..	... ..	... ..	Tinct. Iab. ʒix. Aq. ʒss. t. d. s. 4 days.	Better on second night, and is decreasing; wet flannels now, but not linen shirt.	
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Rep. ʒts. horis. 4 days.	Sweating still less.	C. better; expect. less. Breathing much better. Sleeps much better at night.
contd.	...	...	... ..	... ..	... ..	... ..	... ..	... ..	Rep. ʒxx ʒts. horis. 4 days	Perspirations have quite ceased. Medicine was then discontinued. She was given cod-liver oil, and remained under observation for five weeks more, but there was no return of the sweating.	

TABLE II.—continued.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
S. I.	F.	..	C. 4 weeks or more with expect., hg 4 weeks ago, a table spoonful, smaller quantities since; L. F. C. with expect. many months; Dyspn. L. F. Hæ. several times.	.. ..	Four or five nights; as soon as she gets to bed, just as if water had been thrown over her; sheets wet through.	Tinct. Jab. Mxx Aq. ʒss. 4ts. horis 4 days	Perspirations nearly gone. Medicine discontinued, and no return in a week.	
K. T.	F.	31	.. ..	Rt. crep Lt. crep.	Six weeks; not before goes to sleep, but wakes up in night with it; wet flannels quite through, and night-gown, and sheets, and everything.	Tinct. Jab. Mxx Aq. ʒss 4ts. horis 7 days	Perspirations no better. Medicine makes her sweat, and her month runs water after each dose.	C. less, especially at night.
contd.	..	..	.. ..	.. ..	.. ..	Rep. Mx. 4ts. horis.	Medicine throws her into a heat, and then she perspires all over. Also spits a great deal after each dose. Night sweating very much less than it was.	The medicine was then discontinued, and patient was given an inhalation of Tinct. Jab. ʒi. daily, with Siegle's spray. The cough was eased, expectoration was less, breath was better, and there were no night sweats, C. better.
E. B.	F.	43	C. 3 months, with thick yellow expect. Br very smart at times; L. F. very much.	Crep. both sides at apices.	A little over a week; begins in middle of night, and continues till sheets, and everything quite damp.	Tinct. Jab. Mxx Aq. ʒss 4ts. horis 9 days	Sweats very much after each dose of medicine; never perspired in day-time before; no salivation; night sweating no better.	
contd.	..	..	.. ..	.. ..	.. ..	Rep. 3 days	Still complains of sweating after each dose, but night sweats much less.	
C. B. P.	F.	27	C. with expect.; L. F.	.. ..	Six weeks to two months; worse lately, hardly ever misses a night; night-gown wet through, and sheets damp. All over, but not so much about head.	Tinct. Jab. Mxx Aq. ʒi 4ts. horis 7 days	Has completely cured the perspirations.	
J. P.	M.	37	.. ..	.. ..	Very much indeed last week or two; shirt and bedclothes quite wet.	Tinct. Jab. Mxx Aq. ʒi 4ts. horis 4 days.	Little better first night, much better next night, and none at all last two nights. Medicine discontinued, and no return in three weeks.	Considerable improvement in the cough.

TABLE II.—continued.

Name.	Sex.	Age.	Symptoms.	Physical signs.	Night Sweats—Duration and Severity of.	Treatment.	Result.	Remarks.
W. K.	M.	33	" " " "	Consolidation at right apex, no secretion.	One month, very much at night, two nights out of three, not every night; not before goes to sleep, awakes 3 a.m., wet through, flannels, sheets, bed, and everything.	Tinct. Jab. Mxx. Aq. ʒss. 4fs. horis.	First night no better; second night much better, and better ever since. Medicine discontinued. Remained under observation fortnight, but no return of the sweating.	
S. P.	F.	50	G. every winter as long as can remember, gets rid of it in summer, worse this winter than ever. Br. very short.	Emphysema and bronchitis.	For last two winters, off and on, three or four times a week, an hour or two after going to bed; night-gown and sheets quite wet; has to change things in the morning.	Tinct. Jab. Mxx. Aq. ʒss. 4fs. horis 7 days	Has done perspirations good; this week has not had to change things at all.	Cough and brath- ing better.
W. H.	M.	8	" " " "	Deficient resonance both sides	Three nights, all over body, shirt, and sheets, and all.	Tinct. Jab. Mxx. Aq. ʒi. Quarter die 7 days	Much better. Medicine discontinued, and no return in a week.	
F. K.	M.	7	C. all winter. Is tubercular looking. Pthisis on F.'s side.	Lt. high pitched with cooling ronchus in s. s. f.	One month, getting worse, all over body, but chiefly about head; wets pillow and night-gown; none in day; has perspired very much all his life in summer.	Tinct. Jab. Mv. Aq. ʒi. t. d. s. 4 days.	Better from first night, and still better every night since. Not quite stopped, but nearly.	
contd.	"	"	" " " "	" " " "	" " " "	Rep. 4fs. horis 10 days.	Quite gone. Took steel wine and cod-liver oil for six weeks, and no return of the perspirations.	
E. S.	F.	1½	Throws bed-clothes off at night. Teeth cut late.	Rickets.	Fortnight or more, chiefly about head, enough to make her hair quite wet.	Tinct. Jab. Mv. Aq. ʒi. Quarter die 4 days.	Perspiration quite stopped. Medicine discontinued. Remained under observation for a month, but no return.	
C. B.	M.	1 yr 2 mos	" " " "	Rickets.	Perspires profusely about head.	Tinct. Jab. Mv. 4fs. 10fs 7 days	Perspirations have completely ceased.	
G. M.	M.	43	G with expect.	Consolidation at right apex.	Nine months off and on, getting no better; has it every night now goes to sleep, and awakes wet all over, except head—not enough to wet flannels.	Tinct. Jah. Mvi Aq. ʒi. 4fs. horis 2 days	"A king to what he was as regard, perspirations, did him a great deal of good."	

## Reviews.

*Bibliotheca Therapeutica ; or, Bibliography of Therapeutics.* By EDMUND JOHN WARING, M.D., F.R.C.P., &c. 2 vols. 8vo. pp. 934. New Sydenham Society.

VERY few who have written papers on therapeutical subjects have not felt the want of some index to facilitate reference to work which has already been done in connection with such subjects. Dr. Waring's well-known *Manual of Therapeutics* supplied this want to a great extent, and the author, intending to publish a large encyclopædia of therapeutics, collected an immense quantity of references. Having abandoned his intention of preparing this large work, he has published the bibliographical portion of it separately, under the auspices of the Sydenham Society, and this alone occupies two volumes. It contains monographs on subjects of *materia medica*, and besides the data which are necessary for reference to the books or papers mentioned in the work, the author occasionally presents the reader with short extracts from various reviews, indicating the value of the work referred to, or the nature of its contents. The preparation of such a catalogue as the present one must have entailed enormous labour, such as few men are capable of, and such as rarely brings them the thanks they deserve. We are quite sure, however, that all those who are engaged in the study of *materia medica*, who are not satisfied with merely looking at a few recent papers, but are desirous of learning all that has been done regarding the particular drug which may be the object of their attention, will be exceedingly grateful to Dr. Waring for sparing them so much labour.

*Real-Encyclopädie der Gesammten Heilkunde.* Herausgegeben von Dr. Albert Euleburg. Wien: Urban & Schwartzenberg.

THIS dictionary of medicine, of which we have received the first part, promises to be a good one. This part contains, along with several others, articles on abdominal typhus, abfuhrmittel, abortus and abscess. The article on abdominal typhus is

written by Zülzer, and contains a great deal of information carefully put together, and illustrated by woodcuts of the lesions which occur in the course of the disease, as well as by most instructive diagrams which show at a glance the temperature, urinary constituents, amount of hæmoglobin in the blood, and condition of the pulse at the various stages of the disease. The articles on abortus and abscess are also carefully done, as is also that on abfuhrmittel, although the writer of this does not seem aware of Rutherford's experiments on cholagogues, and his remarks on the therapeutic application of purgatives are rather meagre.

## Clinic of the Month.

### **The Earth Treatment of Abdominal Tumours.**—

Dr. Addinell Hewson of Philadelphia has successfully treated by earth-dressing several cases of abdominal tumours, where either ovariectomy has been indicated, or when the case has been considered hopeless. An account of his proceedings may be found in No. 1 of the *Medical Bulletin* published in Philadelphia. The material he used was pure brick-clay of a yellow tint (due to the iron in it) and free from sand and grit. This was dried by a low fire or in the sun, care being taken not to let it be roasted, because in such a case its therapeutical action was destroyed. It was then rolled and sifted, and about a pound and a quarter mixed with sufficient water to constitute a thick paste was spread all over the affected part. To make it dry quickly he laid a towel over it to absorb the water: the towel was then removed, and in its place a layer of cotton-wool was smoothly spread on the paste for the purpose of hastening the drying, and of holding the clay when dry in its place. The dressing was then completed by a simple bandage, and allowed to remain till it would fall off in from two to five days. He attributes the action of the earth to some chemical property, which also has a calming influence on the pain. One of his first patients was a gentleman who was suffering from abscesses and diffuse inflammation of the cellular tissue of the knee, and had made up his mind to have his leg amputated. He recovered the use of his limb and was completely cured. The other patients who derived benefit from his treatment were all women suffering from tumours of the uterus, and broad ligaments; one of them had narrowly escaped ovariectomy. Another had for years suffered severe pain during the catamenia, caused by a fibro-cystic growth which involved the right ovary. In a third case, the patient had previously undergone ovariectomy, and induced electricity had been applied through the uterus. The tumour grew again after the operation, and proved to be in reality a fibrous tumour of the uterus;

there were besides several points of hernial protrusion of the bowels, on the spot of the wound, and she had the appearance and size of a woman at full term. The earth-dressing was applied under very unfavourable circumstances, but still proved successful, reducing her in size and preventing the hernial protrusions of the bowels by contracting the cicatrix. (*The British Med. Journ.*, Sept. 27, 1879.)

**The Action and Uses of Hyoscyamin.**—Mr. Pri-  
deaux analyses the various papers which have appeared upon the action and uses of hyoscyamin, the active principle of hyoscyamus. This substance, which was first obtained in 1873, is most reliable when it has been obtained as an extractive from the leaves. In its effects hyoscyamin approaches very closely to atropia. The ingestion of a small dose is followed by a reduction of the pulse-rate, accompanied by increased strength and a diminution of the respiratory act. An almost immediate quickening of the pulse-rate, with coincident central excitement, then occurs, followed by motor paralysis, and by loss of power over the co-ordinating centres, as shown by affections of the speech and vision. An hypnotic stage of greater or less duration then follows. Accompanying these symptoms there is always great dilatation of the pupil, hypermetropia, and dryness of the throat and skin. The drug is excreted by the kidneys, and to some extent by the intestinal canal. Death ensues in animals after large doses through failure of the respiratory centre, the heart's action continuing for a few seconds after the cessation of respiration. After a poisonous dose of hyoscyamin the symptoms observed are—a great acceleration of the heart's action, steady fall of temperature, and rapid diminution of the respiratory movements, dependent probably on paralysis of the vagus nerve. In man, hyoscyamin acts as an hypnotic, producing sleep, sometimes of considerable duration, particularly in conditions of the brain where there is great excitement, as in mania, delirium tremens, meningitis, and where ordinary hypnotics, such as opium, are inadmissible; and others, as chloral, have failed or exhausted their effect. In acute mania with a greatly impaired condition of bodily strength, a small dose ( $\frac{1}{18}$  grain) will produce a most marked action, and this is also the case in the excitement of senile dementia; whilst in the excitement of chronic mania large and frequently repeated doses are required to produce any effect. In the use of the drug the bodily condition of the patient must always for this reason be borne in mind. In chronic mania with exacerbations, hyoscyamin is very useful, cutting short the exhibitions of temper and excitement of a violent and destructive character. These

cases as a rule require only one dose, and that a large one, viz.,  $\frac{1}{2}$  grain, or even 1 grain, to effect any good. In conclusion, Mr. Prideaux sums up the results which he has obtained by the use of hyoscyamin in the following words:—

1. In most cases of mania, or where there exists great excitement of any aggressive or destructive character, or rapidity of movement and speech, the use of the drug is the most effectual and rapid means of exercising that form of restraint which has been known as “chemical restraint.”

2. That in cases of acute mania it will produce sleep and quietude when all other drugs have failed, and is one of the most rapid and reliable narcotics which we possess.

3. That in the treatment of the epileptic status in epileptic mania it diminishes the number, frequency, and severity of the attacks, especially if its administration be extended over some time.

4. That in delusional insanity, especially in the mania of suspicion, and in other forms of mania where the delusions are varying and changeable, it has a decided action in producing such an altered condition of the cerebral status that a condition which has been termed “physiological mania” results, and this so eclipses the former delusions and hallucinations that they are forgotten and the mind becomes clear; while, if the subjection to the influence of the drug be continued, it ultimately leads under favourable circumstances to a permanent condition of quiescence, and restoration to a healthy state of mind.

5. That in chronic dementia, associated with destructive tendencies, bad habits, and sleeplessness, the condition of the patient much improves after a continued course of small doses of the drug.

The disadvantages that have occurred from its use, and which have to be guarded against, are—the dryness of the tongue and pharynx that occurs especially after a prolonged administration. This has been thought to contra-indicate its use in cases of artificial feeding, but provided the tube be dipped into an oily liquid before passing, I have not found it any inconvenience. The attacks of vomiting that have occurred in some cases after administration for some weeks necessarily leads to discontinuance of the drug. Vomiting occasionally occurs after one dose, even a small one, and in two cases mentioned by Dr. Lawson hæmatemesis took place. Where rapid and sudden action of the drug is feared in feeble cases, it is better to administer it with the food. (*The Lancet*, September and October, 1879).

**Treatment of Typhoid and of Typhus by the Douche.**—M. Marcowitz of Bucharest communicates to the

International Medical Congress at Amsterdam the results of his observations in regard to the treatment of typhoid and typhus by the douche. The conclusions at which he arrives are: (1) The douche allows of the regular methodical refrigerant treatment of 12·15 severe typhoid cases (allowing two to seven or eight douches for each patient) according to the tendency that the temperature has to return to the same point as before the application, without occupying more than two or three hours a day. (2) The patient is more thoroughly roused by the douche than by the cold bath, and it is due as much to the shock, which acts reflexly upon the nervous centres regulating the heat supply and preventing their paralysis, for some hours at least, as to the actual withdrawal of heat. (3) In regard to contra-indications, M. Marcowitz is able to state with Liebermeister that scarcely anything but intestinal hæmorrhage, and a great paralysis of the heart, accompanied by a small and feeble pulse, is absolutely opposed to the administration of the douche. (4) Pulmonary congestion, so long as it does not depend directly upon cardiac paralysis, is to be regarded rather as an indication than a counter-indication for the use of the douche. (*Le Progrès médical*, Sept. 20, 1879.)

**Treatment of Sub-acute and Chronic Dysentery by Ipecacuanha and Bismuth Injections.**—Dr. Houghton has resided in Sarawak, Borneo, for the last sixteen years, and has held during that time the appointment of Principal Senior Medical Officer to the Government Hospital, where malarial fevers, dysentery, and all endemic tropical diseases, are admitted into the medical wards. He has found, after a very large experience, that besides general treatment local applications in subacute and chronic cases of dysentery, by bismuth injections into the rectum, have succeeded wonderfully, and that a great many hopeless chronic cases have been in this way relieved. The subnitrate of bismuth, to the extent of half a drachm, is to be rubbed down with the same weight of powdered gum in two ounces of cold water, and the resulting solution is to be injected from one to three times a day, according to the severity of the case. It is essential that the enema should be retained. The severe tenesmus and tormina will thus be relieved in a very short time. Ipecacuanha will of course be given, preferably in doses of one scruple to one drachm, at intervals of eight to twelve hours, according to the case, when the rectum symptoms are urgent. Bismuth is a most effectual remedy, and the clinical records of some hundreds of cases speak most highly of its effect. (*The Lancet*, Oct. 4, 1879.)

**Treatment of Dysentery by Rectal Injection.**—Dr. King, commenting upon this method of treatment, which has been lately recommended by Dr. Houghton, remarks that in a large proportion of cases the dysenteric mischief is situated at the lower part of the colon and rectum, and local treatment is therefore of importance. In such cases benefit ensues as a result of directly curative measures; but even when the chief site is higher up, the effort to soothe the mucous membrane of the rectum, and allay spasm of the sphincter ani, amply repays the attempt by affording rest not only to the diseased bowel, but to the patient generally. The attainment of this object is frequently much assisted by the action of bismuth used per rectum. The remedy may be given as an injection, merely suspended in mucilage in the case of children, and in adults where opium is being administered by the mouth, or forty grains may be combined with half a drachm of tincture of opium, and if intolerance of ipecacuanha by the mouth is encountered, two scruples of this drug may be added. In either case the bowel is to be washed out in as gentle a manner as possible with lukewarm water, the object being to simulate the soothing process of fomentation; to procure, for contact with the drugs, a clean surface; and finally to diminish the chance of loss of injection by overcoming beforehand the spasm produced on the first introduction of the tube. The cleansing, if carefully done, is not injurious, but proves of the greatest utility by removing mucous and irritating secretions which by their presence excite tenesmus, a result analogous to the cessation of pain which may be witnessed after removal of a plug of tenacious mucus from the os uteri in cases of chronic metritis. Bismuth and opium injections have also been found useful after the employment of injections of nitrate of silver. (*The Lancet*, Oct. 18, 1879.)

**The Poisonous Properties of Carbolic Acid.**—M. Binnendik read a paper before the Pharmacological section of the International Medical Congress recently held at Amsterdam, in which he discussed the poisonous properties of carbolic acid. The conclusions arrived at are:—(1) That pure carbolic acid is a poisonous substance which acts directly upon the cerebro-spinal nervous system, first stimulating, and finally paralyzing it. It does not appear to exert any influence upon the blood. Hæmoglobin however may often be detected in the urine for a short time after intoxication has been produced. (2) The absorption and elimination of carbolic acid occurs rapidly. The poisonous symptoms are developed very soon after the introduction of the acid, and they disappear before the whole quantity has been eliminated. Under favourable conditions, as after

subcutaneous injection, or administration upon an empty stomach, the elimination is complete in twelve or sixteen hours. (3) Carbolic acid undergoes a change in the organism. It forms complex chemical bodies, such as compound sulphuric ethers of phenol, hydroquinon, and the pyrocatechin of Baumann, which are of a less poisonous nature than the pure carbolic acid. A portion is also in all probability oxidised. (4) Glycerin added to aqueous solutions of carbolic acid diminishes the poisonous effects in rabbits. It has not yet been determined however, whether the glycerin acts by retarding the rate of absorption, or whether its modifying action is due to other circumstances. (*Le Progrès Médical*, October 4, 1879.)

**On the Treatment of Diphtheria.**—Dr. Diamond concludes that the exhausting nature of diphtheria is generally granted, and that stimulants and support are required from the very commencement, whilst depressants and depletion are entirely contra-indicated. A large proportion of the profession advocate the non-interference theory, whilst others again adopt an entirely opposite view in regard to treatment; the great majority adopt a middle course, however, and seek to destroy but not to remove the false membrane. For this purpose all sorts of caustics and disinfectants, from the ancient nitrate of silver to the modern salicylic acid, have been recommended. These remedies however have, according to Dr. Diamond, for the greater part, one objectional feature in common. They are nearly all poisonous, and cannot be swallowed with safety; or if innocuous, they are apt to be powerless. On the whole he prefers the tincture of perchloride of iron, either of full strength or slightly diluted with glycerin. He is also strongly of opinion that the false membrane should be destroyed, and if possible removed. In regard to tracheotomy no opinion is offered, but Dr. Diamond suggests that when it has to be performed, advantage should be taken of the opening to clear away the membranes from the larynx and trachea, and to disinfect their seat. (*The Glasgow Medical Journal*, October, 1879.)

**Peculiar Effects Produced by the Administration of Hydrochlorate of Morphia.**—Mr. Cullenay publishes the following case, which presents two interesting features:—  
1. The development of peculiar symptoms from the administration of morphia; 2. The marked physiological antagonism of belladonna to morphia, proved by the power of the former drug to speedily relieve the ill effects of the administration of the latter. A male coolie, under treatment for lumbago in the Lucea Parochial Hospital, Jamaica, was ordered a hypodermic injection of one-sixth of a grain of morphia, the injection to be

repeated every night. This treatment was continued for three nights, and on the morning following the third use of the injection the patient complained of feeling unwell at breakfast, and retired to bed at 9.10 A.M., when he was seized with convulsions of a tetanic nature. His symptoms were the following:—He was quite insensible; his eyes were widely opened and staring, the pupils slightly contracted; teeth clenched, face flushed, nostrils dilated, and breathing hurried. There was spasmodic contraction of the muscles of the upper extremity; the temperature was increased, the heart's action regular, though weak. This attack lasted about ten minutes, when consciousness returned, but, on attempting to speak, he was seized again, and the convulsions returned at gradually-increasing intervals, until they finally left him at twelve noon. The treatment immediately adopted in this case was the administration of doses of ten drops of the tincture of belladonna every hour, with coffee and brandy, and the application of the extract of belladonna down the course of the spine. This treatment was continued for a few hours, and all urgent symptoms having yielded to it, the belladonna was given in diminished doses of five drops every four hours, and continued for the two following days. At the end of that time, no recurrence of the convulsions having taken place, the ordinary treatment for lumbago was recommenced, of course with the omission of the morphia injection. (*British Medical Journal*, Oct. 18, 1879.)

**Ergot in the Treatment of Fibrous Tumours of the Uterus.**—A critical review on the important and pressing question as to the treatment of fibroid tumours of the uterus, recently appeared in *The Medical Times and Gazette*. In this paper Dr. Herman states that the method of administration of ergot is a point of practical importance. Hildebrandt recommends hypodermic injections of ergotin into the abdominal parietes in the neighbourhood of the tumour. He believes that the drug thus administered acts more energetically than when given by the mouth, and he cites in proof several cases where the administration by the mouth failed to afford relief, whilst the subcutaneous injections were effectual. The experiments of Pezon go far to prove that ergotin administered hypodermically exerts a definite local action, which is powerful and rapid in regard to the vessels in the immediate neighbourhood of the injection, but is slow and feeble in the arteries of distant parts. This method has, however, the disadvantage of being painful, and it is difficult to exert sufficient control over its administration in the case of patients who are not seen every day. The effects of the two methods only appear to differ in intensity, and Dr. Herman therefore contents himself with

giving the drug by the mouth. The inconveniences attending the use of ergot depend either upon a faulty preparation or upon idiosyncrasy. The choice of the preparation of ergotin or sclerotinic acid appears to be immaterial, provided that the drug is fresh and is prepared in small quantities at a<sup>o</sup> time. (*Arch. génér. de méd.*, Nov. 1879.)

**Pleuritic Effusion Treated with Jaborandi.**—Dr. Hunt has employed jaborandi in three cases of pleuritic effusion. In the first and second of these the remedy was only prescribed after the failure of other means of getting rid of the fluid which remained in the pleura following aspiration; and there could be very little doubt that absorption was materially hastened by its use. In the third case jaborandi was the sole drug that was tried, and therefore the results cannot be so conclusive. All the patients bore the jaborandi well: one, indeed, increasing in weight whilst he was sweating profusely under its influence. In no case did it lower the general health to any appreciable extent, and with the exception of the diaphoresis and salivation, there were no inconveniences attending its administration even in the largest doses (ʒjss secundis horis). In none of the cases was any beneficial result obtained until profuse diaphoresis had been excited. (*The Dublin Journal of Medical Science*, Nov. 1879.)

## Extracts from British and Foreign Journals.

**Treatment of Diphtheria with Benzoate of Soda.**—Dr. Letzerich has employed benzoate of soda in severe cases of diphtheria, as is recommended by Prof. Klebs. The dose administered to children under twelve months was a teaspoonful hourly of a 5 per cent. solution, for children of 1 to 6 years the same quantity of a 7-8 per cent. solution, whilst to still older children 8, 10, and 15 grams were given, adults receiving as much as 15-25 grams a day. In no case did any untoward symptoms present themselves. The diphtheritic membrane was powdered with sodium benzoate, the local application being made every three hours in severe cases, and two or three times a day in less urgent ones. In every case the febrile symptoms were checked in from twenty-four to thirty-six hours, the temperature returning nearly to the normal. Dr. Letzerich recommends the employment of this remedy in catarrh of the stomach and intestines, especially in unweaned infants, in whose cases he has employed it with marked effects. It is also beneficial in mycotic catarrh of the bladder. (*Berliner klin. Wochenschr.*, No. 7, 1879. *Abh. f. med. Wiss.* August 9, 1879.)

**Treatment of Asthma by Potassium Iodide and Iodide of Ethyl.**—Dr. Gougeon has observed the beneficial results which occurred in certain cases of dyspnoea, after the use of potassium iodide, either alone or combined with iodide of ethyl. He has therefore in his inaugural thesis analysed the works of M. Sée upon the subject. The monograph by Dr. Gougeon is a faithful and orderly *résumé* of the facts which have been observed. Every one knows how difficult it is to cure or even to benefit the majority of patients who suffer from asthmatic dyspnoea, whether the asthma be chronic or symptomatic. Many medicines have been proposed, but they have failed in their purpose, and have consequently fallen out of use. Prof. Sée, after a great number of investigations, has at last been led to adopt heroic treatment in nearly every case. He administers iodide of potassium at the outset of the disease in a sufficient dose, *i.e.*, at least

1.50 grams, increasing it progressively to 3-4 grams, and only limiting the use of the drug on the appearance of symptoms of iodism. It is found that in this way alone is the action of the remedy real and effectual. In the historical part of his work, M. Gougeon shows, that before M. Sée turned his attention to the drug, it had been employed without any definite rules; and that it was the active principle in several secret remedies for asthma. (*Le Progrès Médical*, September 6, 1879.)

**Normal Reaction of Sweat.**—Trümper and Luchsinger have been recently engaged upon a series of investigations to decide whether human sweat normally possesses an acid reaction. Luchsinger observed some time since, in the course of his experiments as to the existence of a distinct sweat centre, that the secretion obtained from the paws of cats was alkaline, and not, as is usually stated, acid. The skin covering these parts contains no sebaceous but only sweat glands, and from this fact the authors draw the conclusion that the sweat is usually alkaline, and that its acidity is due to admixture with the free fatty acids present in the secretion from the sebaceous glands. This conclusion has lately been verified in respect to man. If the skin be carefully washed, and a secretion of sweat be then produced, either by means of warm baths or by the injection of 0.10 gram of hydrochlorate of pilocarpin hypodermically, the sweat is at first alkaline, though occasionally it is acid, becoming alkaline when the secretion has continued for some length of time. The sweat secreted from the palm of the hand is always acid, although true sebaceous glands are absent; but it becomes alkaline even here when the secretion is prolonged. The sweat glands appear to perform the function of sebaceous glands in this part. A comparison is drawn between glands on the palm of the hand and those found in the ear. These glands, dependent upon degenerative processes, normally decline upon the induction of a free secretion of sweat. (*Pflüger's Archiv*, xviii. p. 494; *Centralblatt f. die med. Wiss.*, May 17, 1879.)

**Bodenhamer on Rectal Medication.**—This essay is intended to draw more attention to the important subject of the administration of food and medicines by the rectum. The method is of great antiquity, and was recommended by Hippocrates, Galen, and Celsus; but it has made little progress towards perfection, and the administration of enefnata of any kind is often mischievously bungled by nurses, students, and even medical men. It is apparently forgotten that foreign substances introduced into the bowel are very apt to excite expulsive action, and therefore that extreme caution should be

observed. The author recommends a screw syringe, which has the advantage that the enema cannot be suddenly shot into the rectum by a careless hand. Whatever instrument is used the fluid should be gently passed in, and so slowly that the bowel may have time to accommodate itself to the presence of the enema. After the administration of a medicated or nourishing enema, should there be a strong or irresistible desire to pass it, as is the case sometimes, when there exists an exquisitely irritable state of the organ, a sponge or fold of cloth dipped in hot water, and firmly pressed against the anus for a while, will generally appease the desire, and enable the patient to retain the enema. The author collects the opinions of some eminent men, and in the end lays down certain conclusions based upon the evidence quoted. He holds that a fuller and more rapid effect can be obtained in this way than by giving drugs by the mouth, and he points out that of narcotics the rectum only requires about one-third of the quantity necessary by the mouth. The book is an interesting contribution to practical medicine. (Pamphlet. New York: W. Wood & Co.—Abstract in *London Medical Record*, Aug. 15, 1879.)

**Medical Treatment of Hæmorrhoids.**—Dr. E. T. Sabal submits to the Medical Brief for August the following:—

R. Iodoform, ʒi. Powder very fine in a mortar, and add—  
Pulv. opii., grs. xv.  
Vaselin, ʒi.

Mix. Apply locally morning and night and after every action of the bowels, after first washing with warm or cold water. One drachm of tannin may also be added to the above to deodorise the iodoform. Keep the bowels open by the following formula:—

R. Magnesiae sulph.  
Magnesiae carb.  
Sulphur. præcip.  
Sacchar. lact. aa. ʒss.  
Pulv. anis. ʒij.

Mix. Dose, one or two teaspoonfuls mixed in water at bedtime. (*The Virginia Medical Monthly*, Aug. 1879.)

**Sulpho-methylate of Soda: a New Purgative.**—M. Raubeau has investigated a new purgative, analogous to sulphovinate of soda. It is obtained by treating methyl alcohol with sulphuric acid, when methyl sulphuric acid and water are obtained. This product is neutralised with carbonate of barium,

when the excess of sulphuric acid is thrown down in the insoluble form of barium sulphate, and there remains in solution sulpho-methylate of baryta, a substance which is very soluble, and which can be crystallised. It is then treated afresh with sulphuric acid, which liberates pure sulpho-methylic acid, which yields sulpho-methylate of soda when neutralised with soda. The salt is white and very soluble, crystallising with difficulty, of a feeble taste comparable to that possessed by sulpho-vinate of soda, with a sweet after-taste. Unfortunately it decomposes very rapidly into sulphate of soda and methylic products of a slightly garlic-like odour. Ten grams of the salt in 25 cc. of water injected into the veins of a dog produced constipation. Acting upon the observation that the substance when introduced into the blood gave rise to constipation, M. Rabuteau believed that it should act as a dialytic purgative when given by the mouth. He therefore administered it to two patients; in one case a woman took 15 grams in two doses, when it produced three stools, of which two were copious; in the second a man took 18 grams, resulting in two stools without colic. The taste of the purgative is hardly perceptible, but it is difficult to preserve it. (*Le Praticien*, Jan. 27, 1879.)

**The Physiological and Therapeutical Effects of Salicylic Acid and its Compounds.**—In an interesting paper, Dr. Moore sums up the recent advances in our knowledge of the physiological and therapeutic effects of salicylic acid. *In Rheumatism* (1) its most beneficial effects are manifested in the more acute cases. In subacute cases there is less, and in chronic cases no advantage from its use. (2) It should be given in doses of not less than 20 grains, every two hours to an adult. (3) Its use should not abruptly terminate on the subsidence of the pain and fever, but the interval between the doses should be more and more prolonged. (4) By its employment "rheumatic fever" may, in the majority of cases, be made a disease of hours, instead of months, as it was formerly. (5) By the brevity of the febrile condition, the chances of the occurrence of cardiac complications are immensely diminished. *In Typhoid Fever* it is found (1) that salicylic acid and its salts have a decidedly beneficial effect in reducing the temperature, and therefore in decreasing the mortality. (2) That its tendency is to shorten the duration of the disease by its antiseptic properties. (3) That the salicylate treatment is equal to any other antipyretic form of medication. (4) That there is every reason to suppose that the salicylates, combined with the cold water treatment, would excel all other methods. (5) That a large dose of one drachm of salicylate of soda acts better given at once than in divided doses.

Such a dose is sufficient for 24 hours. In *Diphtheria* salicylic acid is a valuable agent, since it not only acts as an antiseptic, but also favours the exfoliation of the membrane from the throat by increasing the secretions behind it, and thus tearing it off. It may be used either as a gargle or internally, or in both ways. It may also be employed beneficially in the form of spray, using a solution of the acid in alcohol and water, three grains to the ounce of fluid. The internal use of the salicylate should also be insisted upon. In *Diabetes Mellitus* the salicylate of soda given daily in doses of 120 grains determines a decided diminution in the sugar excreted. The diminution of the saccharine element is liable to considerable variation, according to the class of case, but it is more remarkable by the greatest restriction of carbohydrates in the diet. Diminution of the quantity of urine is parallel with the diminution of sugar. Salicylic acid and its compounds have also been used with more or less success in the following diseases:—Small pox and scarlatina; dilatation of the stomach, mycosis cesophagi; yellow and intermittent fevers; pertussis; rheumatic iritis; neuralgia; dysentery; in ear diseases, in empyema, cystitis and pyelitis; in venereal diseases; pyæmia, erysipelas, surgical fever, &c.; and as an anaphrodisiac, in addition to its use in surgical practice. (*New York Med. Journ.*, July and August, 1879.)

**The Treatment of Paralysis Agitans.**—M. Hammond applies a continuous current to the spinal cord, great sympathetic, and muscles affected by this disease: at the same time he administers strychnia and phosphorus according to the following formula: Phosphate of zinc 0·15.; extract of nux vomica 0·30; conserve of roses q.s. To make 30 pills. A pill to be taken twice a day. This treatment is furthered by a tonic regimen, and the avoidance of all mental or physical excitement. Hammond has had six cases of this nature, of which four were cured within two months. Trousseau had already recommended the use of strychnia alone in this affection. Prof. Charcot had tried various medicines, and amongst others, nitrate of silver, all of which he found to be useless, and he confines himself to the recommendation of continuous currents. The following rules should, according to Dr. Onimus, be attended to, whilst employing continuous currents: The upper part of the spinal cord should be first stimulated with a sufficiently strong current: the negative electrode being placed at the base of the skull, the positive one upon the cervical vertebræ, and superior cervical ganglion. If the paralysis is limited to the upper limbs, the positive electrode should be applied to the brachial plexus for a part of

the sitting, the negative pole being left in its original position. (*Le Concours Médical*, Vol. i., No. 1, July 1879.)

**Hypodermic Use of Colchicin in Rheumatism.**—The solubility of colchicin in water renders it very applicable for hypodermic use. Dr. Badia, a Spanish physician, has communicated a number of successful results after its employment in this way in chronic rheumatism, and these have induced Dr. Heyfelder of St. Petersburg to try it in a series of cases. The results were, on the whole, surprisingly gratifying. The remedy was tried in rheumatic joint affections, neuralgias of the same nature, and especially ischiagra. Two milligrams were injected, in one gram of water, and the action was often remarkable, the severe pain becoming much lessened, and the movability of the affected articulation being rendered much freer. In a case of chronic articular rheumatism of the lower extremity which had existed for years, a surprising result was obtained by daily injections for ten days. There was freedom from pain accompanied by greatly increased mobility; and a relapse having occurred, a similar result was obtained by a single injection. In rheumatic ischiagra, the remedy had generally a very pronounced effect in relieving pain. The first result of the injection is a severe burning pain, which rarely lasts more than half an hour. In about one-third of the cases there was a local inflammatory reaction of varying degree at the place of injection. In very few cases was there any considerable swelling or tenderness. Increased diuresis and strangury were noticed in a few cases. In persons with very sensitive skins it is advisable to use the remedy with great caution, and to diminish the dose. Where local inflammatory phenomena are present, the remedies should be discontinued, or applied at some distance. (*Berlin. klin. Wochenschr.*, No. 26, 1879; *The New York Medical Journal*, June 1879.)

**A Peculiar Affection of the Gait in Habitual Drunkards.**—Dr. Westphal has observed a peculiar form of the disturbance of gait in cases of chronic alcoholism. The affection bears certain resemblances to that occurring in tabes, from which, however, it may be readily differentiated. The peculiarity consists in the fact that at every step the limb is raised very much from the hip-joint, whilst the lower part of the leg remains bent, and then falls as if in the act of stamping. This affection cannot be mistaken for that arising from paralysis of the peroneal muscles, as the characteristic dependence and dragging of the foot is entirely absent. In tabes, on the other hand, the extension is made at the knee. In the disturbance of gait here alluded to there is entire absence of any ataxy of the lower extremities in

the dorsal region: the sensibility remains intact in every form, and the tendon reflex is present to the ordinary extent. It is remarkable that after taking alcohol the disturbance of gait is lessened for a short time. Dr. Westphal explains the affection as due to painful sensations of cramp in the calf and in the knee joint.—(*Charité Annalen*, iv. Jahrgang; *Med. chir. Rundschau*, June 1879.)

**The Topical Uses of Ergot.**—Dr. Dabney has used ergot in cases of pterygium with decided benefit, and has obtained excellent results from its application in pharyngitis. In the latter affection it is of especial use when the blood-vessels of the pharynx are enlarged and tortuous, and when the secretion is not very great. In those cases where the mucous membrane is thickened it acts much more slowly, and in acute cases it possesses no advantage over other remedies. In affections of the pharynx a combination of ergotin with tincture of iodine, as in the following formula, is especially efficacious: Ergotin, grs. xx.; tinct. iod. f. ʒj.; glycerin to make f. ʒj. M. To be applied to the pharynx freely twice a day with a camel's hair brush. In hypertrophy of the tonsils, which is so often an accompaniment of chronic pharyngitis, the same solution applied to the glands two or three times a day gives excellent results. In cervical metritis the following is serviceable: Ergotin (or solid extract of ergot) grs. xx.; extract of belladonna, grs. ij.; cocoa butter q.s. M. Make into six suppositories, and insert into the vagina every night after using the hot douche. In warm weather a solution of ergotin and extract of belladonna in glycerin and water may be used in place of the suppositories, as in the following formula: Ergotin, ʒss.; extract of belladonna, grs. vj.; water and glycerin aa. f. ʒiv. M. A pledget of cotton is to be saturated with this solution and inserted into the vagina at bedtime after the hot douche. The cotton should of course be removed in the morning. (*The American Journal of Medical Science*, July 1879.)

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\* \* Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BALLIÈRE, of King William Street. Charing Cross.

## Department of Public Health.

### ON THE RECENT OUTBREAK OF PLAGUE IN THE PROVINCE OF ASTRAKHAN.

REPORT OF THE BRITISH COMMISSIONERS, SURGEON-MAJOR  
COLVILL AND DR. J. F. PAYNE.

(Continued from p. 400.)

#### *Theories of the Origin of the Epidemic.*

WE find that two theories are held as to the introduction of plague into this region, and we have also thought it right to consider the possibility of its spontaneous origin here.

According to the more generally adopted view the disease was introduced from Resht in Persia, at the southern side of the Caspian Sea, where plague is known to have prevailed in 1877 and at the beginning of 1878. There is no doubt that a considerable trade exists between Resht and Astrakhan, and on a small map it looks very plausible that the disease should in this way have been introduced into Vetlanka. But when we consider that this village is 130 miles from Astrakhan, further separated from the Caspian itself by the length of the Delta of the Volga, making perhaps another 70 miles, the theory of direct importation from Resht to Vetlanka, a distance altogether of 200 miles, becomes extremely improbable. It is as if a disease supposed to be introduced into the Port of London should first be heard of at Oxford or Bath. So much, indeed, has this difficulty been felt that those who believe the Vetlanka disease to have come from Resht base their opinion upon the alleged occurrence of plague a year before at the intermediate

point of Astrakhan. It appears that in July and August 1877 a feverish disease, accompanied by buboes, occurred epidemically in a suburb of Astrakhan. The epidemic was not very fatal, but it attracted the attention of the Government, and an inquiry was ordered by a Dr. Krastorski, who was also sent in the same year to investigate the alleged plague prevailing at Resht. He reported, as we are informed, but we have not seen his Report, that the Resht disease and the Astrakhan disease were the same—from which the conclusion has been drawn that a mild form of plague existed at or near Astrakhan in the summer of 1877. It is right to mention that at Astrakhan we were told by Dr. Cabiadis the epidemic had occurred, not in what would be generally described as a suburb, but in a village called Vorpost, or Vorpostinskaya, the last posting station before reaching Astrakhan from the north, a little more than two miles off on the opposite bank of the Volga. We touched there in descending the river. Other persons of whom we inquired at Astrakhan denied all knowledge of such an epidemic.

The supposed connection between this epidemic and the outbreak at Vetlanka is given as follows:—A woman belonging to Vetlanka visited Astrakhan in the autumn of 1878, and stayed with some relations in the place where the presumed mild form of plague had occurred the autumn before. On her return to Vetlanka she was attacked with plague, and this was the commencement of the epidemic.

We believe the above to be a fair statement of one theory of the origin of the plague, though we must point out that our information was derived from conversation and other sources not admitting of precise verification.

The second theory of the epidemic was first suggested to us in conversation by Count Loris Melikoff; it is that the Vetlanka disease was introduced by the Cossacks returning from the campaign around Erzeroum and Kars. It is supposed that they may have derived it from Turkish troops coming from Bagdad, or else by bringing some articles of clothing, &c., as plunder, which had come over from Bagdad or from some part of Asiatic Turkey infected with plague. Another suggestion is that an extremely malignant and fatal epidemic, which prevailed both in the Russian and Turkish armies, and which was described

as typhus fever, was in reality what has been called "bubonic typhus," that is, a malignant febrile disease, accompanied by buboes, which might very easily be confounded with plague, or rather under which name cases of true plague might have been unwittingly observed and recorded. The most obvious objection to either of these theories is that the soldiers of the Army of the Caucasus with their spoils were distributed to many parts of Southern Russia, and not to this district alone, although it is only here that plague is said to have occurred. Even supposing this difficulty to be got over, other questions would remain to be answered, such as whether there really was any disease in either army or among the prisoners which would have been really plague under another name; whether, again, there is any evidence that the Turkish troops brought the plague with them from Bagdad; and, finally, whether it is at all probable that any articles could have reached Russia from Bagdad and other infected districts which might convey the disease without communicating it in transit. We do not of course, know what evidence may have been collected in answer to the questions, but the result of our inquiries is as follows:—

We have been fortunate in meeting with four doctors who were actually with the Russian Asiatic Army and saw many cases of the fatal epidemic above referred to. They were—a resident medical practitioner at Tzaritzin; Dr. Kriedner, a Russian, in medical charge of Staritzkoi; Dr. Reutlinger, in medical charge of Vetlanka, also a Russian, who was especially sent by the Russian Government to investigate this army epidemic; and Dr. Kiemann, one of the Austrian delegates sent out to investigate the plague, who had served as a military surgeon in the Russian Army of the Caucasus. We specially asked these gentlemen what view they took of the severe disease which affected the Russian army, and whether they had seen anything which, under the name of bubonic typhus, could be confounded with plague. Their testimony was unanimous, and to the following effect:—That they had never seen any disease which could be rightly called bubonic typhus, but that in many cases of typhus diffuse inflammations, gangrene, and parotitis did occur, but that these complications

came on late in the disease, and were not such as to give it any special character. They certainly saw no disease with which the plague could be confounded, and never heard the suggestion that any such disease existed until after their return to Russia.

With regard to the possible existence of plague among the Turkish troops, one of us can positively assert from intimate knowledge that none of the troops who went from Bagdad to the war were known to be suffering from plague. All performed quarantine, and if any escaped from the quarantine stations, it may be taken for granted that they never rejoined their regiments. The long march from Bagdad to the frontier, together with the quarantine by the way (when, if a case of plague had occurred, it would have been speedily made known by the men themselves, or certainly, at any rate, afterwards on their return from the war) was of itself a sufficient test as to the non-existence of plague. Finally, the articles believed to have been brought from Asiatic Turkey, and suspected of being contagious, were nothing more than the ordinary plunder brought in by the Cossacks, consisting chiefly of clothing—Turkish jackets and fezzes. Among things of this kind discovered at Vetlanka much importance seems to have been attached (since we heard of it from Count Loris Melikoff himself) to a certain red silk garment, supposed to have come from Bagdad, and to have been an article of female apparel; but, from the description given, it was pretty clear that it could not have been of Persian or Bagdad manufacture. This suspicion has led to a great quantity of Turkish spoil having been burned by the authorities at Vetlanka and elsewhere in the district. It cannot be doubted, however, that articles of precisely the same kind must have been carried home by Cossacks belonging to the Don and other districts where no rumours of plague have arisen.

We have hinted at the possibility of an independent origin of the plague on the banks of the Volga, and in this connection it is well to draw attention to a fact not generally known, that the disease occurred in an epidemic form in this district and within the same limits at the beginning of the century. This

fact is recorded in the annals of the Moravian community at Sarepta, as will be seen from the following extract from the history written by the Assistant-Pastor Glitsch, and published in 1865:

Extract, pp. 257-258, speaking of the period 1802-1823:—

"The Oriental plague penetrated from the Caucasus deeper into the country, so that we were compelled to have our gates kept by watchmen, who allowed travellers from that region neither to enter the town nor pass through it unless they could show certificates of health. When this disease broke out in Astrakhan in 1806 an officer, a staff surgeon, and eight men were sent here to form a quarantine. The precautions were still more strictly enforced in the next year, when the rumour spread that the plague was again appearing in Astrakhan. No goods such as cotton, &c., were allowed to pass, which was very detrimental to our manufactures; our trade also, especially in tobacco, suffered much, as the Kal-mucks were strictly forbidden to cross our frontier.

"At length, through the representations of our agent, an order was obtained to remove the quarantine from here and place it in a spot where there were no dwellings, the officials being lodged in felt tents. Though this was more convenient to us, since only a post was left here, still we were little better off, inasmuch as our nearest village neighbours were prevented, by the strictly kept cordon, from communicating with us. When, however, in the year 1807, the plague broke out in a village seventy versts (forty-seven miles) distant from Sarepta,<sup>2</sup> all and every connection with the Astrakhan Government was cut off. The post-station, which at that time was placed in Sarepta, was divided into two parts, half on the Tzaritzin side, half on the Astrakhan side, and all who found it necessary to visit the isolated Government exposed themselves to the necessity of undergoing six weeks' quarantine in Tzaritzin on their return. In the following years the danger diminished, and an Order was issued in 1810 for suspending the quarantine, which was carried out in 1812. The post in our town remained, however, till the year 1823, when the last Cossacks departed."

The occurrence of the disease in this district at or near a time when plague is known to have prevailed extensively on the shores of the Caspian and Black Seas would seem to raise a probability that it might recur in the same place whenever the unknown causes which lead to renewed vitality or wider diffusion of plague should again come into operation, as has been the case during the last few years, especially as the sanitary conditions remain the same. Further, we would draw attention to the observations in another part of our Report, showing that the low land in the bed of the Volga has some physical features

<sup>1</sup> Translated from *Geschichte der Brüdergemeine Sarepta*, von Alexander Glitsch. Sarepta, 1865.

<sup>2</sup> Sarepta itself is in the Government of Saratov, near the border of the Government of Astrakhan.

strongly resembling those of districts known to be favourable to the development of plague, and particularly Mesopotamia and Resht, both of which places one of us knows.

### *Quarantine.*

One of the objects we were desired to inquire into was the value of quarantine as put in force in the Government of Astrakhan. Two different kinds of cordon were adopted—one round the whole Province of Astrakhan and a portion of the Province of Saratov, and the other immediately around the individual villages infected. When General Count Loris Melikoff assumed the post of Governor-General early in January, he found that the longer cordon not only involved a great expenditure of troops and considerable outlay, but also, from its very length was ineffectual, although he believed the small cordons round the villages were effectual. This we can easily understand, because the villages being built without any suburbs, the number of inhabitants well known, and the passport system in Russia being very rigorously enforced, it would be very difficult for any one to escape from, or enter, a village without its being known to the authorities. Of these smaller cordons we saw nothing, as they had been removed before our arrival. The longer cordon had also been removed and a much shorter one adopted by General Melikoff. This first cordon of General Melikoff's extended from near Sarapta on the north to Petropaulowski on the south on both sides of the river. On the 19th February it was decided, on the Report of the Medical Commission to curtail this cordon, the northern limit being the village of Graczevka. It was in fact at this village that we first observed for ourselves the quarantine arrangements. On approaching the village we were challenged by a sentry and had to show our passports. We then drove through the main street, and found its further end shut off by hurdles, so as to include a sufficient number of houses for the purposes of the quarantine station. We had to leave our carriage and were taken to an office where we were supplied with the necessary papers. Here we observed from a distance the vedettes outside the village composing the cordon. Considering that the country was flat and bare, these troopers were sufficiently close to prevent any

one crossing the line on the plain during the day-time. But it must be remembered that this line included the bed of the Volga, for the cordon extended on both sides of the river, and the bed of the river is about thirteen miles wide, and a great part of it full of trees, swamps, and brushwood, where precautionary measures did not appear to have been taken. This line of cavalry extended over a wide circuit, and as for a considerable portion of its extent, it ran through barren steppe country, we were told by the aide-de-camp of Count Loris Melikoff that great difficulty and expense were involved in keeping it up. All food for the men, forage, and even water for the horses had to be brought from a considerable distance. The number of men occupied in this limited cordon was about 5,000. As our road lay along the bank of the Volga, we saw nothing more of the quarantine till we arrived at the southern station, Zamian, where we ourselves had to undergo imprisonment for nearly ten days. On approaching the station we were challenged and, indeed, accompanied for some miles by Cossacks, the cordon here running close to the river bank. The quarantine station itself was like the other, merely a portion of the village street not more than 100 or 200 yards in length shut off at both ends. The passages or roads which led off from the street were closed with simple palings. Sentries were placed at the two gates, but the sides of the inclosure seemed to us less carefully guarded. At the time we arrived there were 200 or more persons undergoing quarantine, including a detachment of Cossacks on their way to Astrakhan, and a large number of the women who work in the "watagas," or fish-curing establishments, and who were lodged in a very crowded fashion, partly in cottages, partly in tents supplied by the Red Cross Society. No attempt was made to keep apart those who had entered quarantine at different times, and all were allowed to communicate freely. Further, we should point out that the head police officer and other persons who were constantly within the quarantine limits were not considered to be strictly in quarantine, but appeared to communicate also with persons outside. We had quarters assigned to us in the house of this police officer, who held no communication with us, though we frequently passed him, but whose occupation brought him into constant relation with the people outside. The two

rooms given to us were bare and not very clean, being in a general way like the rooms occupied by travellers in the Government post-houses, though certainly inferior to most of those which we had occupied. We found that no other arrangements were made for our accommodation, and we had considerable difficulty both in obtaining supplies of food and in getting any accommodation for our courier to cook the provisions so obtained. In fact, if it had not been that one of us had a private introduction to a gentleman at Astrakhan speaking English, who was good enough to send us supplies, we should have fared very badly. In such matters, however, our views may have been coloured by the annoyance we felt at the tedium and monotony of quarantine, and we will now speak of the sanitary aspects of this institution.

In the first place, the system as here established was by no means efficient or rigorous, and it was confessed by the authorities that the regulations were carried out with great laxity. This, however, they excused, on the ground that there was no longer any plague in the country, and that the quarantine was rather a matter of form. If any case of plague had occurred, they said, things would have been put on a very different footing. We were also struck with the fact that a large number of persons were here collected with very little sanitary provision, and that had an epidemic disease of any kind broken out within the quarantine limits, it would in all probability have done serious harm before its spread could have been arrested. Those detained here, we must say, appeared to be in very good health, and certainly enjoyed excellent spirits, for their songs, dances, and games were continuous. Our stay here was shortened by two days, in consequence of the abolition of the general sanitary cordon, which was finally raised on the 22nd April. A special cordon was in the first instance established round each of the villages where cases of plague had occurred, and also round the village of Kamenni Jar, in which plague was suspected, though it was afterwards decided that the deaths which had occurred there were due to other causes. The question will naturally be asked whether the elaborate and expensive arrangements instituted by Count Loris Melikoff had any effect in checking the spread of the epidemic? In answer to this, it must be pointed

out that the arrangements were not put in force till, as it now appears, the plague was dying out in every part of the district, and had, indeed, ceased everywhere, except in the village of Selitrenoi, where, as has been said, it arose and continued later than elsewhere, and round which a separate sanitary cordon was maintained until forty days from the last death, that is, till the 26th March.

The other sanitary measures taken by the Russian Government have been chiefly the burning of houses where deaths had occurred, elaborate precautions for the isolation and disinfection of the burial-places of plague-patients, the burning of various articles of clothing, both such as had belonged to persons who died of the plague, and also Turkish and other garments, brought in as plunder by the Cossacks, of which we have already spoken, and the general cleansing and disinfecting of the villages. The burning of houses has been carried out very completely. In Vetlanka alone eighty-four houses or groups of buildings were destroyed, for which 45,000 roubles were paid in compensation. Some few houses, which had been used as hospitals, were burned as they stood, but the majority were for greater safety pulled down, the materials being carried outside the village and burnt in a waste place. We were told that 16,000 roubles had been paid in compensation for clothing destroyed. As an example of the disinfection of burial-places, we may describe the measures which were taken at Staritzkoi. The graves were deepened and the bodies covered with layers of charcoal, quicklime, and earth, while a deep trench was drawn around the whole of the cemetery, intended to intercept the drainage. The measures taken at Vetlanka and Selitrenoi appeared to have been substantially the same, though in certain cases some bodies were removed and reburied. The general sanitary measures carried out in the villages where plague had occurred consisted in removing excrement and other refuse which is usually allowed to accumulate on the surface of the soil. Houses which had been infected with plague, but which it was not thought necessary to destroy, were also disinfected with chloride of lime, but those measures did not appear to be efficiently carried out anywhere, except at Vetlanka. It is not too much to say that sanitary precautions of this kind were

unknown in these places before. With regard to the efficiency of these measures, it is not possible to form any opinion at present. The plague has not recurred during the warm spring weather, and if it does recur it will probably not be till the autumn, while again it is in accordance with experience to expect that should the epidemic reappear in the district, it will not be precisely in the same places as before. We feel bound, however, to say that these measures appear to have been carried out by the Russian Government with great energy and with lavish expenditure, and that they have been in the places chiefly affected willingly submitted to by the population. We found however, that where the epidemic had been slight, the people were disposed to deny it altogether. A quarantine of ten days was enforced on every person leaving the district surrounded by the general cordon. A quarantine of forty-two days was enforced on all persons leaving any of the villages within the general cordon, around which a separate cordon had been placed, and the effect of this arrangement was almost entirely to prevent the inhabitants from cultivating their fields. We may also point out that had any cases of plague occurred during our stay the arrangements would have acted most unfavourably for us. Thus, by observing a case of plague in one small village, we probably should have debarred ourselves from the opportunity of seeing other cases which might have occurred in villages round about, at least till after the lapse of forty-two days, and had we succeeded in seeing cases in two of the villages thus protected, the accumulated quarantine would have amounted to eighty-four days.

Two other important subjects were mentioned in our instructions, viz., the nature of the plague, its characters during life, and its morbid anatomy; and in the second place the mode of spread of the disease, with special reference to personal communication, and to local causes. With respect to the clinical characters and morbid anatomy of the plague, as we have had no opportunity on this occasion of observing the disease either during life or after death, we have no direct information to give. The same is true with regard to the immediate propagation of the disease, whether by personal intercourse, contagion, infection, or otherwise. Such evidence as

we could obtain relating to the origin in, or introduction into, the district of this epidemic we have taken into our consideration, and our conclusions on this point will be given below.

We have in our previous Reports said something about other prevalent fatal diseases in the district, and we have only now to say that we did not find any such diseases to be prevalent except small-pox. Of non-fatal diseases we find that ague and syphilis are the most serious and prevalent. We were also informed that tubercular or Indian leprosy prevails in this district, more especially in certain villages on the left bank of the Volga, but we did not ourselves see any case. We have added in an Appendix some information which we have collected respecting the so-called Siberian plague.

In conclusion we would say that while we find that our views on most parts of the subject perfectly coincide, the difference in our previous experience has naturally led to a somewhat different way of looking at the conclusions to be drawn from the scanty evidence we have relating to the origin of the plague in this district, the view to be taken of such evidence being necessarily modified by previous observations. We have therefore, thought it better, after full consideration of each other's views, and while recognizing the general agreement between us to state our conclusions generally in the subjoined notes.

*Note by Surgeon-Major Colvill.*

I have little or no doubt that the epidemic at Vetlanka was Levantine plague, and I infer, although accounts differed, that the disease in the neighbouring villages was the same.

Supposing that point established, the next question is how the plague reached the banks of the Volga. By some it was said to have spread from Resht, where it was epidemic in the spring of 1877, to Astrakhan, and from there to Vetlanka, while others are equally positive that it was brought by the Russian Asiatic army which had been in contact in Armenia with Turkish troops from Bagdad. By those who maintain the first proposition, that it was brought from Resht, it has been considered necessary to assert that there was plague, or a bubonic disease resembling it, at Astrakhan in July and August, 1877, while the inhabitants themselves, so far as I could learn, were

unaware of its existence. One would think that if plague can stretch itself 800 miles, from Resht to Vetlanka, with only one intermediate stage at Astrakhan, it could easily span the whole distance, but it has been held that sporadic cases occurred in intermediate villages, and that the disease was conveyed by intercommunication; but however natural and obvious it may be to have recourse to such a hypothesis, it does not appear as a solution of the question to have any foundation in fact. Again, it may be said that plague is following its former route on the main line of traffic from the Caspian Sea into Russia, where intercourse is great and goods pass, but be it remembered that if it is to attack human beings at all by the way, the line of the Volga is the only road it can take, for to the east and west of the River Volga the steppes have but a mere sprinkling of wandering beings, scarcely even collected into tribes. The supposition that plague radiating from Resht, by human intercourse, in a circle nearly 2,000 miles in diameter, found only the one spot of the district of Vetlanka at which to become epidemic, dismisses, I think, the idea of its having been carried by animals or goods.

Those who maintain that the disease was brought by the Russian-Asiatic army either from contact with Turkish troops or concealed in the plunder with which they were laden, are very circumstantial in their statements. General Count Lopis Melikoff was so positive as to this mode of conveyance, that he described part of a red female dress, trimmed with velvet, such as I have never seen in Persia or Arabia, which might have carried the disease from Bagdad to Vetlanka. But if the Cossacks of Vetlanka, who were little, if at all, in contact with Turkish troops, plundered, so did all the Cossacks, not only of the Volga but of the Ural, and the far more numerous class of the Don, and yet plague appeared at Vetlanka only. Again, as mentioned in the body of the Report, I can positively assert, from intimate knowledge, that none of the troops from Bagdad who went to the war were known to be suffering from plague. Once more, it has been positively asserted that the typhus fever, which killed 25,000 Russian troops before Erzeroum, was bubonic typhus, in other words plague, but the

Russian medical officers we conversed with who had seen very many cases when with the army, all declared they never dreamed of calling the disease anything but typhus till after their return to Russia, when they heard it was designated bubonic typhus, or plague. They saw no buboes unless the few that might occur ordinarily amongst large bodies of men, though if the patient lived a week or ten days the parotid glands might enlarge. But if this disease had been plague, why should it have confined its outbreak to Velanka, and not appeared all over the country where the Asiatic army had spread on returning home? The stories told on the Volga of old women carrying the disease from village to village bear too striking an analogy to similar tales elsewhere, and resemble one another too closely to admit of their being accepted, even if they appeared more probable. I presume it is generally conceded that the epidemic of plague which prevailed more or less during the last ten years in Mesopotamia was not brought by human intercourse with Benghazi, or any other far-off place, but first showed itself as it were spontaneously near the banks of the Euphrates, in the permanent marsh villages, in which it may be supposed to be endemic, though usually dormant, and then spread to the larger villages and towns. Now Resht, which I know intimately from having previously visited it, has its swamps, its permanent marsh villages, and its temperature of the same nature as on the Euphrates; and so far as can be judged there is no more reason why plague should have appeared on the Euphrates than at Resht, for although we have heard the probable intercourse which has been supposed to take place between Bagdad and Resht commented on by those who can only have looked at a map, I know, as a matter of fact, that there is literally no intercourse between Bagdad and Resht. No natives now pass between the two places pilgrimages having long ceased, and probably not more than ten foreigners in as many years. No goods whatever pass from Mesopotamia to Resht, for Resht is supplied from the Caspian Sea, and only a very small quantity of silk may come from Resht to Bagdad. If plague is supposed to have a spontaneous origin in Mesopotamia, it may, with equal probability, be assigned to a similar origin at Resht, and from the description already given of the

bed of the Volga, the permanent marsh villages there and the villages on the bank, plague may be supposed with equal probability to have had the same spontaneous origin there, or to have arisen from the same cause as on the Euphrates, the three places having become, so far as we know, three independent centres. This opinion is by no means antagonistic to the belief that when plague extends in a locality, it does so year by year in an increasing circle, resembling typhoid fever in the way it spreads; and, like typhoid fever when it suddenly appears at points distant from one another, as Mesopotamia, Resht, and the bed of the Volga, to which no gradual spread can be traced, and when the physical conditions are the same we may, I think, not unfairly infer that the same cause which produced it in the one place did so in the other; and while locally it spreads from house to house, when the conditions are favourable, generally it disseminates itself and attacks those tracts of country which possess, if I may use the expression, plague soil, and this may possibly explain why it adheres in each invasion to nearly the same course, while the sanitary condition of those countries which suffer remains unchanged.

WM. H. C.

*Note by Dr. J. F. Payne.*

I agree generally with the above note, but I wish to disclaim the pretension of having had sufficient experience to pronounce a decided opinion on certain points therein mentioned. I am satisfied that the epidemic at Vetlanka during 1878 and 1879 was true Levantine plague, and there is every reason to believe that the disease in the surrounding villages was the same. The theory that the disease was introduced by Cossacks returning from the war in Asia appears to me, for reasons already stated, to be quite unsupported by any valid evidence. For reasons also given in the body of the Report a direct transference of plague from Resht or elsewhere on the Caspian Sea to Vetlanka appears extremely improbable. No less improbability attaches to the supposition that the plague was brought to Vetlanka by a single individual from a place near Astrakhan, where it was not then prevalent, but only had been so the year before. Everything seems to point to the conclusion that the disease had already gained a footing in the district (whether introduced

from outside or springing up spontaneously in its soil) before the outbreak at Vetlanka. If introduced from Resht then it must have been in the year before, viz., in 1877, and of such an importation there is absolutely no evidence. The doubtful epidemic near Astrakhan in 1877 may, of course, have been derived through some unknown channel from the epidemic then prevailing at Resht; but considering that the place in which it is said to have occurred is in the valley of the Volga, in the district of which we have described the physical features, there is no reason why it should not have originated spontaneously there as well as higher up the river.

No decisive evidence, then, exists on either side to show that this epidemic of 1877 was or was not derived from Resht. Those who hold that it was so seem to be influenced by the view that an epidemic must come from somewhere else, and that in the case of a seaport town or trading-place we must at once conclude that it was introduced from another country with which this place is in communication, and where such disease is known to exist. Astrakhan, however, is peculiar in having no direct communication with ports on the Caspian without transhipment.

With regard to the possible spontaneous origin of the disease in the district my experience does not entitle me to speak with the same confidence as my colleague, Surgeon-Major Colvill. It appears to me, however, that the same reasons which will hold to show that plague is endemic or springs up without being introduced from elsewhere in other parts of the world seem to apply here. Actual proof of such an origin would clearly be almost in any case quite unattainable, but the difficulties which beset all theories of accounting for its introduction into the district certainly argue strongly in favour of such a view.

In speaking of spontaneous origin we desire to avoid committing ourselves to any opinion on the disputed question whether specific febrile diseases do or do not originate *de novo*. If they do not then new outbreaks of such diseases will often have to be accounted for by supposing that germs lying dormant are brought into new vitality by a change of physical conditions.

J. F. P.

## APPENDICES.

## A.

*An Official Return of the Epidemic in Vetlanka, showing the Number of Houses in Village, and Deaths, &c.*

Houses 314. Persons at present in the Village, 1,368. Number of Persons who Died, 362. Number who Recovered, 55.

EXTRACT from the Return showing those Houses only which were attacked. The remainder must be considered to have escaped.

No. of House.	Persons who escaped.	Died.	Attacked and recovered.	No. of House.	Persons who escaped.	Died.	Attacked and recovered.	No. of House.	Persons who escaped.	Died.	Attacked and recovered.
1	7	3	3	47	...	4	...	93	...	2	...
2	...	4	...	48	...	1	...	94	...	5	...
3	...	2	1	49	...	1	...	95	...	2	...
4	10	2	...	50	...	1	...	96	...	3	...
5	5	2	...	51	...	6	...	97	...	4	...
6	...	5	4	52	...	6	...	98	...	4	...
7	...	3	...	53	...	1	...	99	...	6	...
8	...	2	...	54	...	1	...	100	...	1	...
9	6	1	...	55	...	2	...	101	...	1	...
10	4	3	1	56	...	3	...	102	...	1	...
11	...	3	...	57	...	1	...	103	...	1	...
12	...	5	...	58	...	1	...	104	...	1	...
13	...	3	...	59	...	2	...	105	...	3	...
14	2	2	...	60	...	1	...	106	...	1	...
15	5	...	1	61	...	2	...	107	...	6	...
16	7	...	2	62	...	1	...	108	...	4	...
17	4	...	1	63	...	2	...	109	...	1	...
18	5	...	1	64	...	1	...	110	...	2	...
19	3	1	...	65	...	2	...	111	...	...	1
20	...	2	...	66	...	6	...	112	...	...	1
21	...	7	...	67	...	3	...	113	...	2	...
22	4	...	1	68	...	1	...	114	...	8	...
23	5	...	2	69	...	2	...	115	...	1	...
24	7	1	...	70	...	1	...	116	...	8	...
25	3	...	1	71	...	1	...	117	...	4	...
26	6	...	1	72	...	4	...	118	...	1	...
27	...	2	...	73	...	1	...	119	...	...	...
28	7	...	...	74	...	6	...	120	...	2	...
29	7	...	3	75	...	1	...	121	...	...	...
30	6	1	2	76	...	3	...	122	...	...	...
31	...	7	...	77	...	2	...	123	...	...	...
32	8	...	2	78	...	2	...	124	...	...	...
33	...	5	...	79	...	1	...	125	...	...	...
34	2	1	...	80	...	9	...	126	...	...	...
35	...	2	...	81	...	5	...	127	...	...	...
36	10	3	...	82	...	4	...	128	...	...	...
37	7	2	...	83	...	7	...	129	...	...	...
38	6	4	...	84	...	1	...	130	...	...	...
39	4	2	...	85	...	2	...	131	...	...	...
40	...	7	...	86	...	7	...	132	...	...	...
41	...	6	...	87	...	10	...	133	...	...	...
42	7	...	2	88	...	2	...	134	...	...	...
43	...	8	...	89	...	1	...	135	...	...	...
44	6	1	...	90	...	4	...	136	...	...	...
45	5	1	...	91	...	...	...	137	...	...	...
46	...	1	...	92	...	11	...	138	...	...	...
				6	...	1	...				
				...	...	...	...	449	862	58	...

## B.

*Account of Fatal Case at Selitrenoi.*

The case of which we witnessed the autopsy at Selitrenoi was that of a middle-aged man, whose illness was said to have lasted four days, but as he refused to call in a doctor till the last day the duration of the illness must be regarded as uncertain. When seen by a doctor he was feverish and drowsy, and refused to answer questions. His temperature taken on two occasions was 100·4 and 102·2 respectively. These were all the details we were able to obtain. The *post-mortem* examination took place in the open air, near the cemetery, and was skilfully and rapidly performed by Dr. Belin, of the University of Moscow. There were also present M. Balaschow, the temporary Governor of the town; the Chief Police Officer; Professor Jacoby, member of the Russian Medical Commission, and two or three younger doctors. As no notes were taken by others we did not produce a note-book, but wrote down the following immediately afterwards :—

Examination, twenty-four hours after death. Body of a man perhaps forty years old, very muscular and well-nourished. Considerable *post-mortem* discoloration about shoulders and neck. The neck was much swollen and showed a tumour on the right side. There were purplish petechial spots on the shoulders, arms, and abdomen. His throat was first examined. Epiglottis slightly swollen, the vocal cords very much so. No false membrane. Larynx and fauces deeply blood-stained, but not oedematous. Frothy blood issuing from the mouth. Pharynx natural. The right parotid much enlarged, highly vascular and oedematous but showing no suppuration. The left slightly enlarged, but less so than the right. On the left side one lymphatic gland was enlarged to the size of an acorn, and very oedematous in appearance. The lymphatic glands otherwise quite natural. Lungs, pleural adhesion on both sides. Bases and posterior portions of both lungs, especially the left, extremely congested and very dark, showing a high degree of

hypostatic congestion, being quite black in parts. There was no hepatization. Heart, nearly empty, containing few or no clots, the walls flabby. Blood everywhere very dark coloured, quite fluid and staining the organs deeply. Spleen, decidedly enlarged; not weighed, but probably from 12 to 16 ozs., substance firm and colour dark. Liver, fair-sized, dark colour, streaming with blood, but not specially abnormal. Kidneys, large, vascular; substance somewhat mottled, surface smooth. Intestines appear natural. The Peyer's patches were examined and found natural. Stomach pale and natural. Urinary and genital organs not examined. Head not opened.

Our judgment of the case was that it was evidently one of death from some malignant febrile disease, complicated with parotitis (inflammation of the salivary glands), but that it was impossible from the appearances after death alone to say precisely what disease. We could not call it a case of plague. It might have been a malignant form of one of the typhus fevers, either exanthematic typhus or relapsing fever, though, according to English experience, death at so early a period is uncommon, even in the former disease, and particularly so in the latter. It would, however, be useless to speculate further on the subject, as our knowledge of the history of the case during life was too incomplete to permit us to arrive at more precise conclusions.

### C.

#### *Siberian Plague.*

We have taken several opportunities of making inquiries about this subject, not so much with the view of investigating the disease itself as of finding out what is really meant by the name. All the doctors with whom we have spoken, both Russian and foreign, understand by it a carbuncular or pustular disease, believed to be conveyed to mankind from animals, usually from horned cattle, though others regard horses as the more common source of contagion. It is very partially distributed in Russia, but Selitrenoi is one of the places where it occurs, and the very intelligent parish priest there gave us a

good description of the complaint, as he had observed it himself. He said it began with a small black spot, which itches for a day or two, and afterwards becomes so hard that it cannot be cut with a knife. The surrounding parts swell very much, especially if it is situated on the head or face. It is generally fatal in three or four days "unless taken in time." By this seems to be meant burning out the place with a hot iron. The description appears to us to correspond very well with what is called "malignant pustule," or "charbon." The disease is not thought to spread from one person to another, and no one is afraid of catching it. There is a cattle disease called by the same name, about which the priest could not give us so much information. The people do not seem to think that the human disease is contracted from cattle.

It is probable, or indeed certain, that popular diagnosis may often confound other local diseases with "Siberian Plague," but there seems no doubt that the people know in a broad and general way what they mean by it.

We must, therefore, conclude that this disease has nothing whatever to do with true plague, and that reports of the occurrence of "Siberian Plague" need not cause any apprehension that there is an epidemic of the Levantine disease. Such apprehensions, however, are, considering the confusion of names and the tone of alarm in which this disease is sometimes spoken of by the Russian newspapers, by no means unnatural. As an example of newspaper reports, we beg to quote the following paragraph from the *Petersburger Herald*, a German paper published in St. Petersburg, for the 17th (29th) March, 1879. It is published on the authority of a Russian paper called *Pravitelstvennyi Vestnik*. "The Governor of Charkow reported to the Minister of the Interior, on the 13th March, that a peasant had been taken ill with Siberian Plague in a place called Kurtówka, in the district of Odessa. The doctor who was called in (M. Hole) decided that it was a case of Siberian Plague without any general infection of the organism. The patient died on the 12th March. After his burial precautionary measures were taken—his things were burned, his house isolated and disinfected. The Governor is about to visit the place, in company with the Medical Inspector, in order to

satisfy himself that the proper measures have been taken." From this paragraph it would appear that the Governor of Charkow and his adviser regarded the disease as contagious from man to man, which is not the general belief, unless there has been some confusion on the part of the writer. In any case, there is nothing to suggest Levantine Plague, though possibly some obscure notion of this kind may have been present in the mind of the writer of the paragraph.

## INDEX TO VOL. XXIII.

### A.

ABDOMINAL tumours, earth treatment of, 445  
 Abortion, 371  
 Acetate of lead, its action on bile, 483  
 Agave, treatment of (Dr. Gage Parsons), 48  
 Aconite in pneumonia (A. C. F. Raba-  
 gliati, M.A., M.D.), 87  
 Agaricum in the night-sweats of con-  
 sumptive patients (Prof. Peter), 209  
 Albuminuria, treatment of (M. Bouchet),  
 203  
 Alcohol, an antidote for strychnia (M.  
 Hambeau), 380; its action on bile,  
 422  
 Aloes, its action on bile, 411  
 Alpagonorello (Dr.), scrophulosis  
 treated by tayuya, 56  
 Alvarenga (M.), propylamin, 365  
 Alvin (Dr.), internal and external  
 action of thymic acid and thymate of  
 soda, 49  
 Ammonium chloride, its action on bile,  
 332  
 Ammonium phosphate, action on bile  
 of, 414  
 Anæmia, pernicious progressive, 296  
 Anæsthesia, produced by the inhalation  
 of iodoform, 129  
 Anderson (Dr. McCall), pilocarpin in  
 nephritis, 208  
 Andrews (Prof.), cure of hæmorrhoids,  
 126  
 Aneurism (internal), chloride of barium  
 in, 37  
 Animalculæ, skin diseases caused by,  
 371  
 Anspecht (Dr.), diffuse inflammation of  
 the liver caused by phosphorus, 48  
 Antagonism of opium and belladonna  
 (Dr. Davis), 214  
 Antidote to poisoning by phosphorus,  
 55

Antidotes for strychnia (Dr. Huse-  
 mann), 218  
 Antifebrile effects of cold enemata (M.  
 Lapin), 210  
 Antipyretic, conchinin as an, 128  
 Antiseptic dressings with boracic acid  
 (Dr. Solger), 208  
 Antiseptic, menthol a new, 47  
 Antiseptic transfusion of human blood  
 (Dr. Macewen), 206  
 Anti-syphilitic, tayuya as an, 289  
 Arloing (S.), "Recherches experimen-  
 tales comparatives sur l'Action du  
 Chloral, du Chloroforme, et de  
 l'Ether" (Review), 201  
 Armaingaud (M.), relation between  
 heart disease and hysteria, 293  
 Atropin and Duboisia, the relative action  
 of, 247  
 Arragon (Dr.), treatment of psoriasis  
 with pyrogallie acid, 207  
 Arrest of perspiration, 371  
 Arsenic acid injections in psoriasis,  
 288  
 Arsenic, contribution to the study of  
 the physiological action of (Dr.  
 Elbridge, Cutler, and Bradford), 218;  
 in uterine hæmorrhage (Dr. Hum-  
 phrey), 294; localisation of, in the  
 brain, 283  
 Artificial ischæmia, the physiological  
 effects of (S. Fubini), 362  
 Ashby (Alfred, M.B.), illustrations of  
 the arrest of infectious diseases by  
 isolation of the sick, 148  
 Asphyxia, diagnosis of certain forms of  
 (Dr. Draper), 298  
 Asthma, iodine in dry, 379; morphia  
 in, 278; therapeutical value of drug-  
 smoking in, 100; treated by the  
 hypodermic injection of morphia  
 (Dr. H. Huchard), 53; treated by  
 potassium iodide and iodide of ethyl  
 (Dr. Gougeon), 453  
 Astrakhan, plague in the province of,  
 303, 382, 461

Astringents and faradisation in the treatment of purpura hæmorrhagica, 278  
 Ataxy after diphtheria (R. Schulz), 379  
 Athetosis, post-mortem examination in a case of (Dr. Sidney Ringer), 161  
 Atkinson (Dr. F. P.), treatment of hæmorrhoids, 105  
 Atropia in night-sweating of phthisis, 93  
 Atropia sulphate, its action on bile, 421  
 Atropin in treatment of opium poisoning, 123; in the treatment of traumatic tetanus (Mr. Cullimore), 209  
 Automatic and other medical electricity (Dr. Francis Imlach), 258

## B.

BAPTISIN, its action on bile, 337  
 Barnes (Dr. Fancourt), "Midwifery for Midwives" (Review), 119  
 Belladonna and opium, their antagonism, 214  
 Benson (Dr. H. Percy), quinine as an ebolic, 428  
 Benzoate of sodium as an antipyretic and antiseptic, 217  
 Benzoic acid and its compounds, their action on bile, 415  
 Bibliography, 60, 137, 223, 460  
 "Bibliotheca Therapeutica; or, Bibliography of Therapeutics," Dr. E. J. Waring, F.R.C.P. (Review), 443  
 Bile, physiological actions of drugs on the secretion of, 321, 410; secretion of in a curarised fasting dog, 330  
 Binnendik (M.), poisonous properties of carbolic acid, 449  
 Bismuth in dysentery, 448  
 Blyth (Alex. Winter, M.R.C.S.), "Manual of Practical Chemistry" (Review), 200  
 Board of Health, in United States, 72  
 Bodenhamer on rectal medication, 454  
 Body temperature in health, effect of salicylic acid on, 184  
 Boracic acid in skin diseases (Neumann), 133  
 Boric acid in antiseptic treatment of wounds, 208  
 Bosworth (Dr.), laryngeal phthisis, 280  
 Bouchat (M.), chloral as an anæsthetic for children, 127; treatment of albuminuria, 203  
 Bowels, obstruction of the, 372  
 Bradford (Dr.), physiological action of arsenic, 213

"Brain and its Diseases" (Dr. Thomas Stretch Dowse), (Review), 120  
 Brandis (Dr.), treatment of syphilis, 222  
 Bromide of potassium, the cause of otitis externa circumscripta (Dr. Green), 134  
 Bromine vapour in croup (Dr. Jaeger), 136  
 Bronchitis, vesicular emphysema and collapse of the lungs complications of, 18; on bronchiectasy as a complication of, 23; on catarrhal pneumonia as a complication of, 27 (continued from p. 432, vol. xii.)  
 Bubo, 372  
 Butlin (Mr.), fur on the tongue, 219

## C.

CALABAR bean, its action on bile, 431  
 Campbell (Dr.), treatment of enteritis, 287  
 Cape diarrhoea and dysentery (Dr. Brinsley Nicholson), 283  
 Capitan (Dr.), oedematous laryngitis cured by iodide of ethyl, 136  
 Carbolic acid in diphtheria, 205; inhalations in pertussis, 376; injections in erysipelas, 133; poisonous properties of (M. Binnendik), 449  
 Carbonate of soda, physiological action of (Dr. Schoenlein), 300  
 Carcinoma, 370  
 Cardiac disease; iron and chloride of ammonium in certain stages of, 81  
 Cardiac dyspnoea (Prof. Sée), 366  
 Castor oil: its action on bile, 332  
 Caucasus, plague in the, 224  
 Cerebral apoplexy, 370  
 Changes in the spinal cord and peripheral nerves in old stumps (Drs. Déjérine and Mayer), 54  
 Charcot, Prof. "Lectures on Bright's Disease of the Kidneys" (Review), 361  
 Chaulmoogra oil in leprosy (Dr. Wyndham Cottle), 202  
 Chiene (John, F.R.C.S.E.), a counter irritant; its action, 177  
 Chills, congestive, 371  
 Chloral as an anæsthetic for children (M. Bouchat), 127  
 Chloral poisoning, nitrite of amyl in, 204  
 Chloride of barium in internal aneurism (Dr. F. Flint), 37  
 Chloride of sodium with corrosive sublimate injections in syphilis (Dr. G. Matthes), 286  
 Chloroform in heart disease (M. Dieulafoy), 380

Chloroform-poisoning, 370  
 Chlorosis (M. Hayem), 372  
 Cholera, causes of, in their relation to sanitary improvements, 138; observations on recent news as to (Dr. Surgeon-General John Murray), 68; treated by hypodermic injection of morphia (Dr. Batukram Mehta), 367  
 Chorea, 372; treated by the hypodermic injection of Fowler's solution (Dr. L. Péron), 368; treated with ether-spray (Dr. Mareiglia), 292; treatment of (Dr. Hayden), 34  
 Churton (Dr.), liquor ammoniac and digitalis in cardiac thrombosis, 206  
 Cinchonidia, and quinia, iodides of, 215  
 "Clinical Lectures on Diseases of the Urinary Organs," Sir Henry Thompson (Review), 274  
 "Clinical remarks on Gleet," Dr. J. C. Gilvie Hill (Review), 274  
 Clysters of chloral hydrate, the application of (Dr. Starcke), 57  
 Coffee, hypodermic injections of (Dr. Pallen), 51.  
 Coghill (Dr. Sinclair), hypophosphites in phthisis, 363; nitrite of amyl in chloral poisoning, 204  
 Colchicin in rheumatism, hypodermic use of, 458  
 Colchicum, its action on bile, 411  
 Cold bath in enteric fever (Dr. Alex. Collie), 367  
 Cold enemata, antifebrile effects of, 210  
 Collie (Dr. Alex.), cold bath in enteric fever, 367  
 Colocynth, its action on bile, 412  
 Conchium as an antipyretic (Dr. Strumpell), 128  
 Congestive chills, 371  
 Conia and its salts, experimental and clinical study of (M. Tiryakan), 202; therapeutic employment of the salts of, 212  
 Consumption, agaricum in night-sweats of, 209  
 Cooper (Mr.), unhealthy local and syphilitic sores treated by immersion, 46  
 Copper, physiological action of (M. Gallipe), 282  
 Cory (Dr. Robert), relation of protective vaccination to the development of the vesicle, 61  
 Coto bark in the diarrhoea of phthisis (Dr. J. Burney Yeø), 257  
 Cottle (Dr. Wyndham), Chaulmoogra oil in leprosy, 202  
 Counter-irritant: its action (John Chano, F.R.C.S.E.), 177

Courtenay (Mr.), peculiar effects produced by the administration of hydrochlorate of morphia, 450  
 Cranial bones, disease of, in infantile syphilis (M. Parrot), 220  
 Croom (J. Halliday, M.B.), "Minor Gynecological Operations and Appliances" (Review), 119  
 Croton oil; its action on bile, 331  
 Croup, 371; bromine vapour, in, 136; membranous, 371  
 Crowther (Mr.), hyposulphate of soda as a specific in zymotic disease, 369  
 Cullimore (Mr.), atropin in the treatment of traumatic tetanus, 209  
 Carei (Dr.), hydrate of chloral in dysentery, 297  
 Cutler (Dr.), physiological action of arsenic, 213  
 Cysticerci diagnosed during life (Dr. Pollak), 381  
 Cystitis after cantharides, new method of preventing (M. Guyot Danneey), 123; internal use of quinia in, 292

# D.

DABNEY (Dr.), topical uses of ergot, 459  
 Danneey (M. Guyot), method of preventing cystitis after cantharides, 123  
 Davis (Dr.), the antagonism of opium and belladonna, 214  
 "Deafness, Giddiness, and Noises in the Head," Dr. Edward Woakes (Review), 42  
 Deb (Mr. Amrito Lal), Hedysarum gangeticum in dysentery, 290  
 Decoctum pollini in syphilitic eye diseases, 219  
 Density or proximity of population; its advantages and disadvantages (Dr. W. Farr, F.R.S., &c.), 76  
 Déjérine and Mayer (Drs.), changes in the spinal cord and peripheral nerves in old stumps, 54  
 Diabetes mellitus cured by extract of nux vomica (Dr. Eug. Zarzana), 51; morphia in treatment of, 58  
 Diamond (Dr.), treatment of diphtheria, 450  
 Diarrhoea and dysentery (Cape) treatment of, 283; of phthisis, 257  
 Dieulafoy (M.), chloroform in heart disease, 380  
 Digestive agents, action of ferments as, 285  
 Dilute nitro-hydrochloric acid, its action on bile, 413  
 Diphtheria, ataxy after, 379; of the pharynx, inhalation of eucalyptus

- oil in, 364; sulphur præcipitatum as a topical application in, 272; treated with benzoate of soda (Dr. Letzerich), 453; treated by carbolic acid and iodoform (Dr. Garnett), 205; treatment of (Dr. Diamond), 450
- Disease and mortality: some results from a comparison of registrations of disease with returns of mortality (Dr. William Squire), 229
- Disease caused by cysticerci in brain, mistaken during life for hydrophobia (T. M. Dolan, F.R.C.S.E.), 34
- Disease, present and permanent treatment of, 349
- Dobell (Dr.), formula of podophyllin, 124
- Dolan (T. M., F.R.C.S.E.), disease caused by cysticerci in brain, mistaken during life for hydrophobia, 34
- Douche treatment of typhoid and typhus, 447
- Dover's powder in night-sweats, 192
- Dowse (Dr. Thomas Struth), "The Brain and its Diseases" (Review), 120
- Draper (Dr.), diagnosis of certain forms of asphyxia, 293
- Drouot (M.), on the diuretic action of squill, 44
- Drug-smoking, therapeutical value of, in asthma (Dr. Reginald E. Thompson), 104
- Drugs, physiological actions of, on the secretion of bile (Dr. William Rutherford, F.R.S.), 321
- Duboisia and atropin, the relative action of (Dr. Sidney Ringer), 247
- Duboisia, therapeutic action of, 221
- Dufau (Dr.), stigmas of maize in disease of the bladder, 281
- Duncan (Dr.), treatment of nasopharyngeal catarrh, 134
- Dysentery, 372; hydrate of chloral in, 297; Hedyсарum gangeticum in, 290; sub-acute and chronic, treated by ipecacuanha and bismuth injections (Dr. Houghton), 448; treated by rectal injection (Dr. King), 449
- Dyspepsia (nervous), Leube, 300
- Dyspnœa, quebracho a palliative remedy in, 284
- E.
- EARTH treatment of abdominal tumours (Dr. Addinell Hewson), 445
- Eczema, 371; notes on the treatment of (Dr. James Sawyer, M.R.C.P.), 246
- Elbridge (Dr.), physiological action of arsenic, 213
- Electricity, automatic and medical, 259; rheophores and wires, 261; electric sandal, 261; electric treadle, 267; single and double commutators, 267; electric desk, 270
- Enteric fever, cold bath in, 367
- Epilepsy, 372
- Epiphytic, new to Europe, 239
- Erectile tumours, 371
- Ergot, action of (Dr. Petou), 52; in the treatment of fibrous tumours of the uterus, 451; in the treatment of pneumonia (Dr. Wells), 240; topical uses of (Dr. Dalmeijer), 450
- Erysipelas, 370; treated by injections of carbolic acid (Dr. Huter), 133; treatment of (Dr. Huter), 216
- Ether spray in chorea, 292
- "Etude historique et clinique sur la Trépanation du Crâne; la Trépanation guidée par les Localisations Cérébrales," Dr. Just Lucas-Champagnière (Review), 120
- Eucalyptus oil in diphtheria of the pharynx, inhalation of, 364
- Eulenburg (Dr. Albert), "Real-Encyclopædie der gesamten Heilkunde" (Review), 443
- Euonymin and iridin, 125; its action on bile, 335
- Excitement, treatment of (Dr. Campbell), 287
- Eye diseases, yellow oxide of mercury in, 56
- Eye in sleep and disease, 135
- F.
- FARQUHARSON (Dr. Robert), incontinence of urine, 7
- Farr (Dr. W., F.R.S.), density or proximity of population, its advantages and disadvantages, 76
- Féréol (M.), treatment of neuralgia by sulphate of copper, 43
- Ferments, action of, employed as digestive agents (M. Vulpian), 285
- Ferrier (Dr. David), "Localisation of Cerebral Disease" (Review), 120
- Fœtus, life of the, in utero after the death of the mother, 103
- Fubini (S.), physiological effects of artificial ischæmia, 362
- Fibrous tumours of the uterus, ergot in the treatment of, 451
- "First Lines of Therapeutics," Alexander Harvey, M.A., M.D. (Review), 276
- First respiratory movement (Dr. Franz von Preuschen), 291

Flint (Dr. F.), chloride of barium in internal aneurism, 37  
Foreign body in œsophagus, 370  
Forrest and Finlayson (Drs.), spectroscopic examination of the urine, 239  
Fothergill (Dr. J. Milner), present and permanent treatment of disease, 349  
Fur on the tongue (Mr. Butlin), 219

G.

GARR in habitual drunkard, peculiar affection of the (Dr. Westphal), 458  
Gallard (M.), vaginismus, 299  
Gallic acid in night-sweating of phthisis, 96  
Gallipe (M.), physiological action of copper, 282  
Gamboge, its action on bile, 333  
Garezky (C.), duration of life of the fetus in utero after the death of the mother, 133  
Garnett (Dr.), treatment of diphtheria by carbolic acid and iodoform, 205  
Gelsemium in neuralgia (Prof. Massini), 45; in hectic (Dr. Holden), 375  
Glycerine in the treatment of hæmorrhoids (Dr. David Young), 250  
Goitre, 371  
Gougeon (Dr.), treatment of asthma by potassium iodide and iodide of ethyl, 453  
Green (Dr.), bromide of potassium the cause of otitis externa circumscripta, 134  
Griffith (Dr. G. de Gorrequer), on loaded and blocked rectum, and manipulations per rectum, 28  
Griswold (Dr.), pilocarpin in intermittent fever, 365

H.

HÆMOPTYSIS, 370  
Hæmorrhages, 371  
Hæmorrhoids, medical treatment of (Dr. E. T. Sabal), 455  
Hæmorrhoids, glycerine in the treatment of (Dr. David Young), 250; treatment of (Dr. F. P. Atkinson), 105; cure of (Prof. Andrews), 126  
Hameau (M.), alcohol an antidote for strychnia, 380  
Hamilton (D. J., M.B.), on vesicular emphysema and collapse of the lung as complications of bronchitis, 18  
Hammond (M.), paralysis agitans, 457  
"Handbook on the Diagnosis of Skin Diseases" Robert Loveing, A.M., M.D. (Review), 120

Harvey (Alexander, M.A., M.D.), "First Lines of Therapeutics" (Review), 276  
Hayden (Dr.), treatment of chorea, 54  
Hayem (M.), treatment of chlorosis, 372  
Heart disease and hysteria, relation between (M. Armaingaud), 293  
Hectic, gelsemium in, 375  
Hedysarum gangeticum in dysentery (Mr. Amvito Lall Deth), 290  
Hepatic stimulants, mode of action of, 425  
Hernia, 372  
Hess (Dr.), a rare cause of œdema, 284  
Hewson (Dr. Addinell), earth treatment of abdominal tumours, 445  
Hicough, 370  
Hill (Dr. J. C. Ogilvie), "Clinical Remarks on Gleet" (Review), 274  
Hirsch (Dr. Aug.), recent outbreak of plague in the province of Astrakhan, 303  
Holden (Dr.) gelsemium in hectic, 375  
Holland (Dr. J. W.), urine in yellow fever, 1  
Houghton (Dr.), treatment of subacute and chronic dysentery by ipecacuanha and bismuth injections, 418  
Huchard (M. Henri), morphia in asthma, 278; treatment of asthma by the hypodermic injection of morphia, 53  
Hueter (Dr.), treatment of erysipelas by injections of carbolic acid, 133  
Humphrey (Dr.), arsenic in uterine hæmorrhage, 294  
Hunt (Dr.), pleuritic effusion treated with jaborandi, 452  
Husemann (Dr.), antidotes for strychnia, 218  
Hüter (Dr.), treatment of erysipelas, 216  
Hydrastin, its action on bile, 336  
Hydrate of chloral in dysentery (Dr. Curci), 297  
Hydriodic acid (Dr. Gill Wylie), 300  
Hydrochlorate of morphia, effects produced by the administration of (Mr. Courtenay), 450  
Hydrocyanic acid, therapeutic value of (Dr. Keith Norman Macdonald), 45  
Hydrophobia, 372; disease caused by cysticerci in brain mistaken during life for, 34  
Hyoscyamin, action and uses of (Mr. Prideaux), 446  
Hyoscyamus, its action on bile, 422  
Hypodermic medication, 370  
Hypophosphites in phthisis (Dr. Sinclair Coghill), 363

Hyposulphite of soda as a specific in zymotic disease (Mr. Crowther), 369  
 Hysteria in boys (Dr. Wm. Roberts, F.R.S.), 338

## I.

IMLACH (Dr. Francis), automatic and other medical electricity, 258  
 Immersion, unhealthy local and syphilitic sores treated by, 46  
 India and the cholera, 138  
 Infantile convulsions, 371  
 Infectious diseases, arrest of, by isolation of the sick, 148  
 Inflammation of the middle ear in scarlatina (Dr. Miles), 129  
 Intermittent fever, pilocarpin in, 365  
 Iodide of ethyl in oedematous laryngitis, 136  
 Iodides of cinchonidia and quinia (Dr. Vansant), 215  
 Iodine in dry asthma (Dr. Lee Reed), 379; in the treatment of intermittent fevers (Dr. Wadsworth), 279  
 Iodoform in diphtheria, 205; as a local anæsthetic (Dr. Moleschott), 59; inhalation producing anæsthesia, 129  
 Ipecacuanha in dysentery, 448  
 Ipecacuan, its action on bile, 412  
 Iridin and euonymin, 125  
 Iridin, its action on bile, 335  
 Iron and chloride of ammonium in certain stages of cardiac disease (Dr. T. Grainger Stewart), 81  
 Iron in night-sweating of phthisis, 97  
 Isolation of the sick in the arrest of infectious diseases, 148

## J.

JABORANDI and pilocarpin in night-sweating of phthisis, 430; in the treatment of syphilis (Mr. Lockwood), 293; its action on bile, 423; table of cases of night-sweating treated with, 438  
 Jaeger (Dr.) bromine vapour in croup, 136  
 Jalap, its action on bile, 412  
 James's powder, composition and therapeutic uses of true (Dr. O'Connell), 375  
 Jones (C. Handfield, M.B., F.R.S.), story of a whitlow with tracing, 14  
 Jones (Dr. Macnaughton), mydriatics and myotics, 363  
 Jodanidin, its action on bile, 337

## K.

KRELLER (Herr), physiological action of platinum, 52  
 Kelp (Dr.), nocturnal incontinence, 376  
 King (Dr.), treatment of dysentery by rectal injection, 419  
 Klebs (Prof.), sodium benzoate in infectious diseases, 132; and Tommasi-Crudeli (Signor), recent researches on the nature of malaria, with remarks on the mode of action of quinine, 107

## L.

LAPIN (M.), antifebrile effects of cold enemata, 210  
 Laryngeal phthisis (Dr. Bosworth), 280  
 "Lectures on Bright's Disease of the Kidneys," Professor Charcot (Review), 381  
 "Lectures on the Diseases of Women," Charles West, M.D., with additions, by J. Matthews Duncan, M.D. (Review), 119  
 Leprosy, Chaulmoogra oil in, 202  
 Leptandrin, its action on bile, 411  
 Letzerich (Dr.), treatment of diphtheria with benzoate of soda, 453  
 Leube (Herr), nervous dyspepsia, 300  
 Lewis (Dr. T. R.), India and the cholera, 138  
 Life of the foetus in utero after the death of the mother (C. Serejsky), 133  
 Lime salts, therapeutic administration of, 46  
 Liquor ammoniæ and digitalis in cardiac thrombosis (Dr. Churton), 206  
 Liveing (Robert A. M., M.D.) "Handbook on the Diagnosis of Skin Diseases" (Review), 120  
 Liver, inflammation of, caused by phosphorus, 48  
 Local applications in night-sweats of phthisis, 99  
 Localisation of arsenic in the brain (M. de Poilley), 283  
 "Localisation of Cerebral Disease," Dr. David Ferrier, F.R.S. (Review), 120  
 Lockwood (Mr.), jaborandi in the treatment of syphilis, 293  
 Lucas-Championnière (Dr. Just) "Étude historique et clinique sur la Trépanation du Crâne; la Trépanation guidée par les Localisations cérébrales" (Review), 120

Lung, collapse of the, &c., as complications of bronchitis (D. J. Hamilton, M.B., &c.), 18

M.

MACDONALD (Dr. Keith Norman), therapeutic value of hydrocyanic acid, 45

Macewen (Dr.), antiseptic transfusion of human blood, 206

MacLagan (Dr.), acute rheumatism treated by salicin and salicylic acid, 125

Magnesium sulphate, its action on bile, 331

Maize, stigmas of, in disease of the bladder, 281

Malarial cachexia (Dr. Webster), 377

Malaria, recent researches on the nature of, with remarks on the mode of action of quinine (Prof. Klebs and Signor Tommasi-Crudeli), 107

Malt-extracts, 404

Malt-preparations, administration of, with food, 406; predigestion of starchy food by, 407

"Manual of Practical Chemistry," Alexander Winter Blyth, M.R.C.S. (Review), 200

Marcowitz (M.), treatment of typhoid and typhus by the douche, 447

Mareiglia (Dr.), chorea treated with ether spray, 292

Massini (Prof.), gelsemium in neuralgia, 45

Matthes (Dr. G.), chloride of sodium with corrosive sublimate injections in syphilis, 286

"Medical Therapeutics," George H. Napheys, A.M., M.D. (Review), 206

Mehta (Dr. Batukram), treatment of cholera by hypodermic injection, 367

Membranous croup, 371

Menthol, a new antiseptic, 47

"Midwifery for Midwives," Dr. Fancourt Barnes (Review), 119

Migraine, a contribution to the therapeutics of (Dr. Seguin), 57

Miles (Dr.), treatment of inflammation of the middle ear in scarlatina, 129

"Minor Gynecological Operations and Appliances," J. Holliday Croom, M.B. (Review), 119

Moleschott (Dr.), iodoform as a local anæsthetic, 59

Moore (Dr.), physiological and therapeutic effects of salicylic acid and its compounds, 456

Morjé (Dr.), oxalate of cerium in pertussis, 381

Morphia in asthma (M. Henri Huchard), 278; in treatment of diabetes mellitus (Prof. Pecholier), 58; its action on bile, 422

Mumps, recent observations on (Dr. Pinet), 378

Murray (Dr. Surgeon-General J.), observations on recent news as to cholera, 68

Murrell (Dr. Wm.), night-sweating of phthisis, 91, 192, 241, 430

Mydriatics and myotics (Dr. Munnaughton Jones), 363

Myers (Dr. Worthington), nervous dyspepsia, 294

N.

NASAL catarrhs and their treatment, 58

Nasal polypus, 371

Napheys (George H., A.M., M.D.), "Medical Therapeutics" (Review), 200

Naso-pharyngeal catarrh (Dr. Duncan), 134

Newland (Dr.), nitrate of pilocarpin in pleuro-pneumonia, 294

Nervous dyspepsia (Dr. Worthington Myers), 294

Nervous Dyspepsia (Leube), 300

Neumann on boracic acid in skin diseases, 133

Neuralgia, gelsemium in, 45; treated by sulphate of copper (M. Féréal), 49

Nicholson (Dr. Brinsley), treatment of Cape diarrhoea and dysentery, 283

Night-sweating of phthisis (Dr. William Murrell), 91, 192, 241, 431

Night-sweats, 371

Nitrate of pilocarpin in pleuro-pneumonia (Dr. Newland), 294

Nitrite of amyl in chloral poisoning (Dr. Sinclair Coghill), 204; in night-sweating of phthisis, 97

Nocturnal enuresis, 371

Nocturnal incontinence (Dr. Kelp), 376

Normal reaction of sweat (Trumpy and Luhsinger), 454

North (W., B.A.), effect of salicylic acid on the body temperature in health, with some remarks on the temperature of the urine, 184

Nux vomica in diabetes mellitus, 51

O.

OBSTRUCTION of the bowels, 372

O'Connell (Dr.), composition and therapeutic uses of true James's powder, 375

- Edema, a rare cause of (Dr. Hess), 264  
 Edematous laryngitis cured by iodide of ethyl (Dr. Capitan), 136  
 Onions, disease of, 233  
 Opium and belladonna, their antagonism, 214  
 Opium-poisoning, 371; treated by atropin, 123  
 Otis (Dr. Fessenden N.), "Stricture of the Male Urethra; its Radical Cure" (Review), 360  
 Otitis externa circumscripta, caused by bromide of potassium, 134  
 Owen (Dr.), Warburg's tincture and its therapeutic value in Indian fevers, 55  
 Oxalate of cerium in pertussis (Dr. Morjé), 381  
 Oxide of zinc in night-sweating of phthisis, 91  
 Oxygen as an antidote to poisoning by phosphorus, 55
- P.
- PALLEN (Dr.), hypodermic injections of coffee, 51  
 Panthel (Dr.), treatment of traumatic tetanus, 54  
 Paralysis agitans (M. Hammond), 457  
 Pariot (M.), disease of cranial bones in infantile syphilis, 220  
 Parsons (Dr. Gage), treatment of acne, 48  
 Pavy (F. W., M.D., F.R.S.), "Points connected with Diabetes" (Review),  
 Payne (Dr. J. F.), outbreak of plague in the province of Astrakhan, 382  
 Pecholier (Prof.), morphia in treatment of diabetes mellitus, 58  
 Pellizzari (Dr. C.), tayuya as an anti-syphilitic, 289  
 Penzoldt (Dr.), quebracho, a palliative remedy in dyspnoea, 284  
 Pernicious progressive anæmia (C. M. Sörensen), 296  
 Peroud (Dr. L.), treatment of chorea by the hypodermic injection of Fowler's solution, 366  
 Perspiration, arrest of, 371  
 Pertussis, oxalate of cerium in, 381; treated by inhalations of carbolic acid, 376  
 Peter (Prof.), agaricum in the night-sweats of consumptive patients, 209  
 Peton (Dr.), action of ergot, 52  
 Phosphorus causing diffuse inflammation of the liver (Dr. Anspecht), 48; poisoning, oxygen as an antidote to, 55  
 Phthisis, diarrhoea of, 257; hypophosphites in, 363; table of cases treated the night-sweating of, 91, 192, 241, 430  
 Physiological action of drugs on the secretion of bile (Dr. William Rutherford, F.R.S.), 321  
 Phytolacca, its action on bile, 710  
 Pierotoxine in night-sweating of phthisis, 241  
 Pilocarpin and jaborandi in the night-sweating of phthisis, 430; table of cases treated with pilocarpine, 435; in intermittent fever (Dr. Griswold), 365; in nephritis (Dr. McCall Anderson), 208; notes on (Dr. Spillman), 374  
 Pilocarpinum muraticum in children's diseases, 130  
 Pinet (Dr.), recent observations on mumps, 378  
 Plague in the Caucasus: a study in sanitary science (Dr. Tholozan), 224  
 Plague in the province of Astrakhan (Dr. Aug. Hirsch), 303; (Dr. J. Payne), 382  
 Platinum, physiological action of (Herr Kehler), 52  
 Pleuritic effusion treated with jaborandi (Dr. Hunt), 452  
 Pleuro-pneumonia, nitrate of pilocarpin in, 294  
 Pneumonia, aconite in, 87; ergot in the treatment of, 280  
 Podophyllin; its action on bile, 335; formula of (Dr. Dobell), 124  
 "Points connected with Diabetes," F. W. Pavy, M.D., F.R.S. (Review), 275  
 Pollak (Dr.), cysticerci diagnosed during life, 381  
 Poncy (M. de), localisation of meningitis in the brain, 283  
 Population; density or proximity of, its advantages and disadvantages, 76  
 Post-mortem examination on a case of athetosis (Dr. Sidney Ringer), 361  
 Potassium bicarbonate, its action on bile, 415  
 Potassium iodide, its action on bile, 415  
 Potassium sulphate, its action on bile, 414  
 "Pott's Disease, its Pathology and Mechanical Treatment, &c." Dr. Newton M. Shaffer (Review), 360  
 Pregnancy, vomiting in, 295  
 Present and permanent treatment of disease (Dr. J. Milner Fothergill), 349  
 Preuschen (Dr. Franz von), causes of the first respiratory movement, 291  
 Propylamin (M. Alvarenga), 365  
 Psoriasis treated with resorcinol, 374

